HP Performance Optimized Datacenter 40c North America
Maintenance and Service Guide

Abstract

This guide provides maintenance and service guidance for the HP Performance Optimized Datacenter 40c NA (HP POD 40c NA).

Part Number: 756850-001
December 2013
Edition: 1

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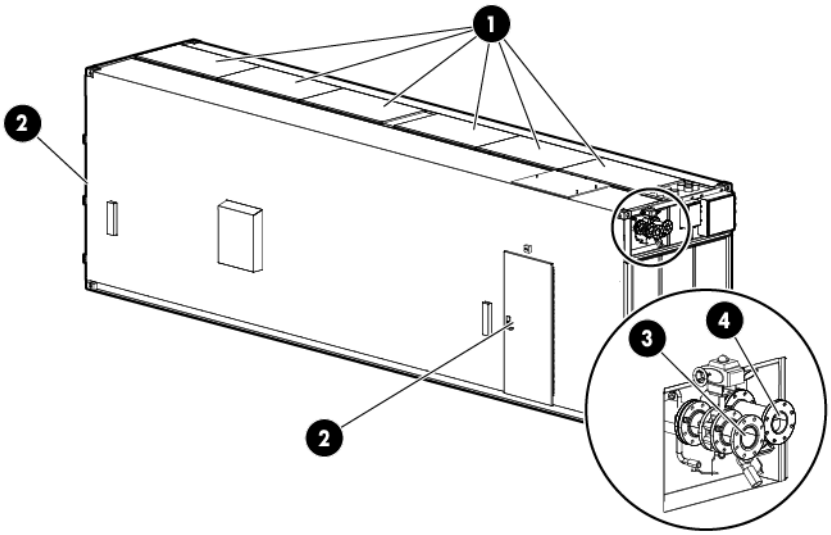
Illustrated parts catalog

Structural component identification

The HP POD 40c NA documentation frequently refers to the specific components of the HP POD 40c NA as shown in the following figure and described in the following table.



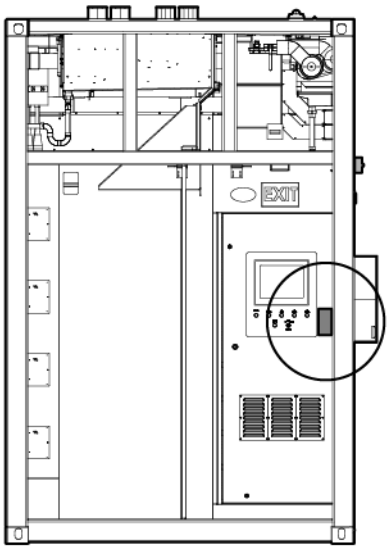
Item	Component	Description
1	Heat exchanger access hatches	Provides access to the overhead heat exchangers
2	Personnel access doors	Provides access to the POD
3	Facility chilled water return	Facilitates the return of chilled water to the POD
4	Facility chilled water supply	Facilitates the supply of chilled water to the POD

Parts and part number identification

Review the contents of the HP POD 40c NA to identify the following for each component:

- Model number—The model number is located on the door to the control panel inside the cold aisle of the HP POD 40c NA, as shown in the following figure.

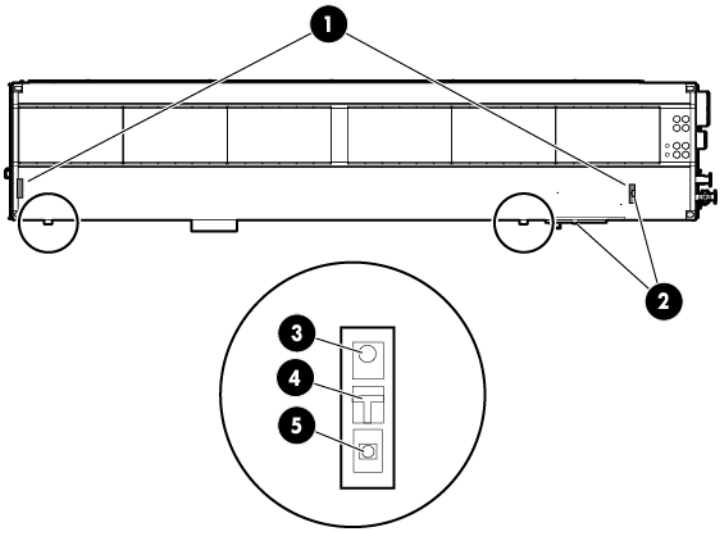
- Regulatory compliance identification number—This product has been assigned a unique regulatory model number and is located on the door to the control panel inside the cold aisle of the HP POD 40c NA, as shown in the following figure.



Life safety component identification

Internal life safety components

Top view shown



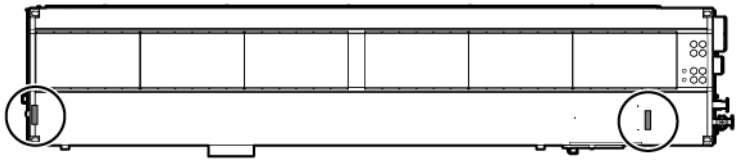
Item	Component	Description
1	Exit sign locations	Indicates the location of an exit
2	Fire strobe light	Indicates a fire alarm condition within the HP POD 40c NA
3	EPO button	Disconnects the HP POD 40c NA from main power feeds

Item	Component	Description
4	Fire alarm manual pull*	Enables manual initiation of the fire system, which includes activating the interior and exterior fire strobe lights and the optional fire suppression system
5	Fire suppression abort button*	Aborts the fire suppression system. A fire suppression abort button is located next to each personnel door.

*This is an optional component that might not be included.

Exit sign locations

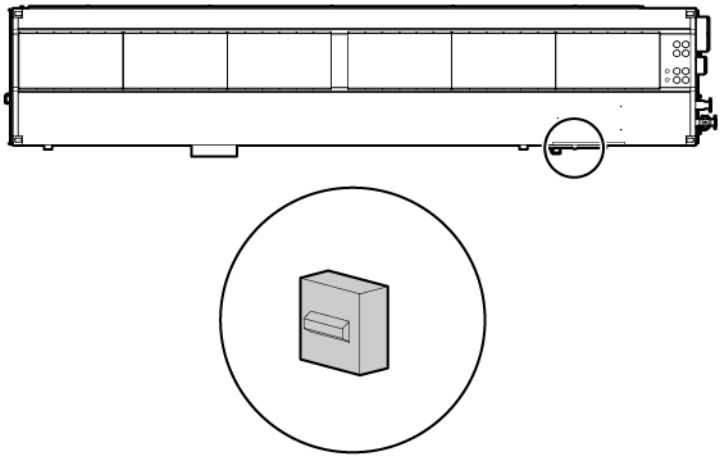
Top view shown



External emergency status indicators

The HP POD 40c NA has one external fire strobe light that indicates a fire alarm condition.

Top view shown

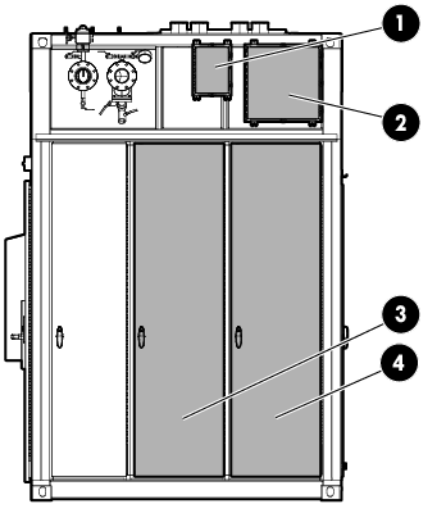


Electrical power component identification

⚠ **WARNING:** To avoid the risk of personal injury or loss of life, all personnel must comply with PPE requirements when opening or working inside areas of the HP POD 40c NA that are marked as hazardous voltage, per NFPA 70E in accordance with NEC (NA) and IEC (EMEA and APJ).

⚠ **WARNING:** To avoid the risk of personal injury or loss of life, all personnel must comply with electrical warning labels when operating and maintaining the electrical panels and systems of the HP POD 40c NA.

Front view shown

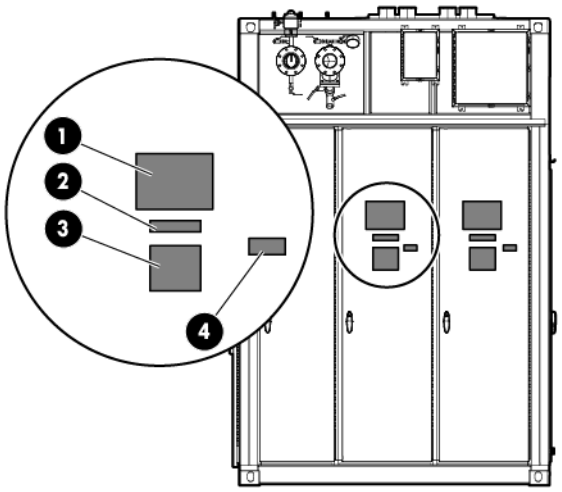


Item	Component	Description
1	Fire box*	Connection location for fire emergency and VESDAnet signals
2	Demarcation box*	Customer communication connection point: • ECS • Security • Phone
3	415/240V 3-phase, wye, 4-wire, 800 A electrical panel	A feed power for critical IT loads (electrical busways) and house power
4	415/240V 3-phase, wye, 4-wire, 800 A electrical panel	B feed power for critical IT loads (electrical busways) and house power

*The demarcation box and the fire box are communication data points that are provided on the POD by HP. Connecting these data points is the responsibility of the customer, unless an approved Statement of Work is initiated.

External panel labels

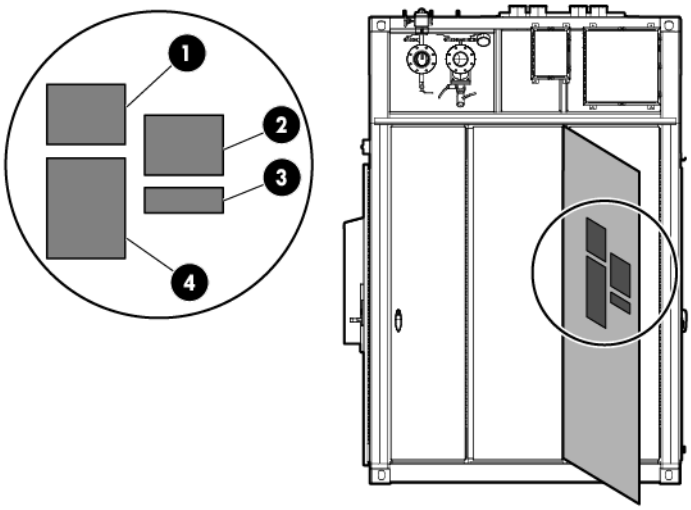
Front view shown



Callout	Electrical safety label	Description
1	Danger sign	Provides a reminder to users that the electrical panels must be accessed only by authorized personnel
2	Disconnect label	Provides the order for disconnecting all of the electrical panels
3	Caution	Cautions users about isolating power from the HP POD 40c NA
4	Arc flash warning	Provides a reminder to users of the danger of arc flash and required PPE

Internal panel labels

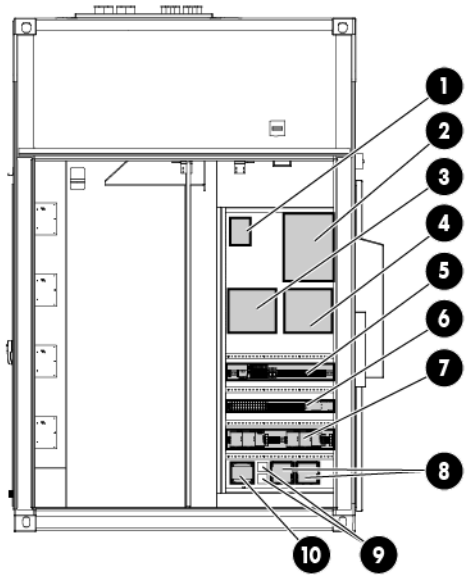
Front view shown



Item	Electrical safety label	Description
1	Input power	Lists the input power information

Item	Electrical safety label	Description
2	Panel schedule/circuit breaker table	Lists the layout and designation for all circuit breakers on the panel
3	Fuse type table	Lists all fuse type and sizes
4	Wire color code	415Y/240V color codes • Purple/Brown—Phase A/L1 • Purple/Orange—Phase B/L2 • Purple/Yellow—Phase 3/L3 • Purple/White—Neutral • Green and yellow—Equipment ground

Control cabinet component identification



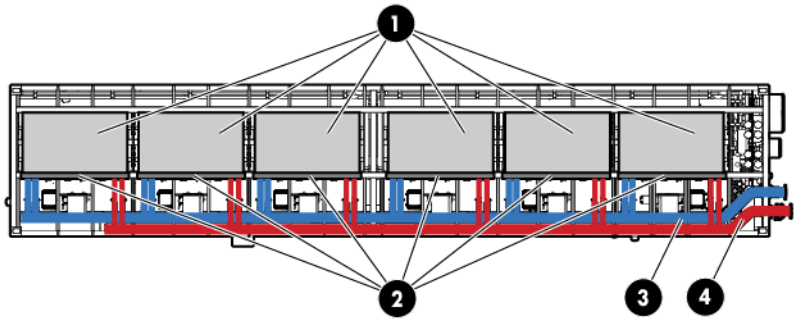
Item	Component	Description
1	VESDA air sampling smoke detection unit	An early warning laser scan smoke detection unit
2	VESDA power supply with battery backup	Provides power to the VESDA and backup power to the VESDA during a utility power loss
3	Fire alarm and suppression release control panel	• Controls all fire systems in the HP POD 40c NA, including the smoke detection system, fire suppression system, and fire pulls. • Includes a battery backup system that provides backup power to the fire system during a utility power loss
4	Customer connection box	Controls information monitored by the HP POD 40c NA access control components
5	ECS relays and ECS modules	Relays for the ECS control, ECS communications, I/O connections, and terminal block connections
6	EPO controller board and house panel fuses	Connections for the EPO system and fuses for other house panel components

Item	Component	Description
7	Dual power supplies with battery backup	Provides 24 V DC power to the PLC, LED lighting, and ECS systems
8	Batteries	Provides 24 V DC power to the PLC and ECS system
9	Control transformers	Provides to the power flow control valve
10	240/120 V transformer	Provides house power to the convenience outlets
—	PLC	The computer that controls the ECS system (located on the inside door of the control cabinet)

Cooling system component identification

The heat exchanger access hatches are located on top of the POD. The hatches are coated with a durable finish to prevent corrosion.

Side view shown



Item	Component	Description
1	Heat exchangers	Use facility chilled water to cool the air in the HP POD 40c NA
2	Heat exchanger fan banks	Operate at variable speeds to maintain the preprogrammed differential pressure setpoint and the hot aisle temperature setpoint
3	Chilled water supply	Supplies facility chilled water to cool the HP POD 40c NA
4	Chilled water return	Returns heated chilled water to the facility

HP POD 40c NA racks

The HP POD 40c NA contains a total of 20 IT racks.

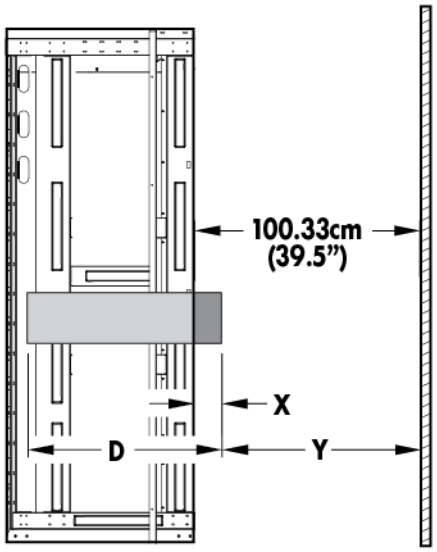
△ **CAUTION:** If any racks contain empty RU space, use the HP POD 40c NA filler panels to maintain the efficiency of the HP POD 40c NA thermal system. Filler panels are available from HP in 10-pack quantities (part number AQ682A) and 100-pack quantities (part number AS993A).

For more information about racks and network cabling, see the *HP Performance Optimized Datacenter Networking Guide*.

Aisle clearances

Cold aisle clearance

The maximum protrusion of any installed IT component directly impacts the available cold aisle clearance for removal and replacement of other IT components. Maximum component depth must follow the clear aisle distance calculations. The following figure shows how to calculate this distance.

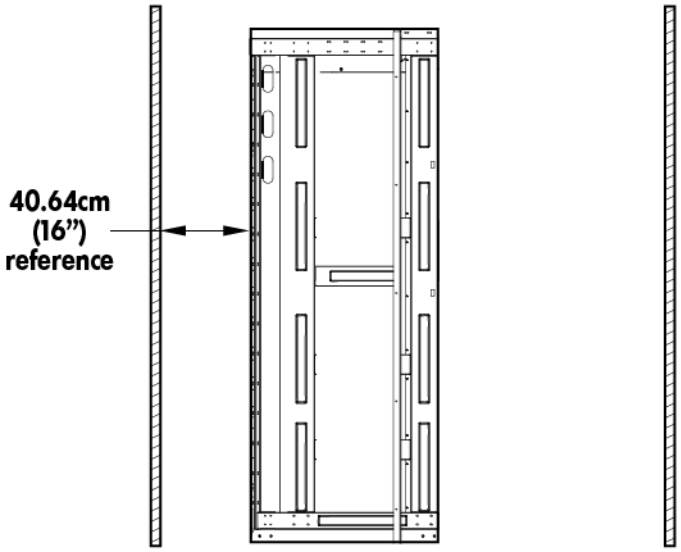


The maximum rack face-to-cold aisle wall distance is 39.5 inches. In the figure, **X** represents any protrusion into the cold aisle starting from the rack face of the installed IT component (for example, the bezel). **Y** represents cold aisle clearance. The cold aisle clearance dictates the maximum depth (**D**) of any installed IT component. To find the maximum cold aisle clearance, calculate **100.33 cm (39.5 in) - X = Y**.

IMPORTANT: As the value for **X** increases, the value for **Y** decreases, which also decreases the maximum depth allowed for an installed component.

Hot aisle clearance

Hot aisle clearance is defined as the distance from the rear of the rack to the hot aisle wall. The reference distance of 2.54 cm (16 in) must be considered when selecting IT infrastructure that will populate into the hot aisle.



Replaceable components

Each HP POD 40c NA is unique and the specific replaceable components vary for each POD. For specific replaceable component information, see the Operations and Maintenance Manual for the HP Performance Optimized Datacenter 40c North America.

Removal and replacement procedures

Safety considerations

The HP POD 40c NA is listed to the UL 69050 standard as an Information Technology Product and Classified according to the NEC, NFPA-70, 2008.

The HP POD 40c NA is not suitable for long term personnel occupancy.

The safety information is specific to the people operating and maintaining the components of the HP POD 40c NA.

IMPORTANT: All plumbing to and from the HP POD 40c NA must be completed by a licensed plumber.

IMPORTANT: All wiring in and around the HP POD 40c NA must be completed by a licensed electrician.

Operator safety

The HP POD 40c NA is not habitable or suitable for human occupancy. The HP POD 40c NA is Listed as a Product that provides service access areas for periodic maintenance and service. These areas must be controlled and available for use only by owner-authorized personnel and qualified personnel who are trained in the maintenance and service of the HP POD 40c NA components.

WARNING: To avoid the risk of personal injury or loss of life, all personnel must comply with PPE requirements when opening or working inside areas of the HP POD 40c NA that are marked as hazardous voltage, per NFPA 70E in accordance with NEC (NA) and IEC (EMEA and APJ).

WARNING: To avoid the risk of personal injury, hearing protection must be worn at all times when working inside the HP POD 40c NA.

WARNING: To avoid the risk of personal injury or damage to the equipment, do not insert anything inside the electrical busways, except for the approved HP busway drop boxes.

Before completing the installation of the HP POD 40c NA, the customer, or a designated agent, is responsible for completing any Environmental Health and Safety evaluation of the HP POD 40c NA or any attached structural component purchased through HP. The customer, or their designated agent, must also complete an arc flash assessment and breaker coordination study of the HP POD 40c NA and the associated electrical supply system for operation and maintenance. The individual or organization that completes the arc flash assessment must also create and provide all required labeling for all electrical panels on the HP POD 40c NA.

Fire detection and suppression

The fire detection and suppression system is a "Manufacturer Designed" system specifically for this HP product, in compliance with national standards.

The HP standard suppression system, supplied as an optional component for the HP POD 40c NA, includes a Novec 1230 clean agent system. However, if the customer or local AHJ requires specific modifications or a replacement, HP can assist in these actions at the expense of the customer.

HP does not certify that the fire detection and suppression system that is installed in the HP POD 40c NA meets all local and jurisdictional requirements. The customer is responsible for the following actions as related to the fire suppression system:

- Verifying that the POD detection and suppression system meets local codes, including specific local requirements for initial and periodic inspections
- Arranging for and receiving all required local permits, including initial commissioning as well as standard and repair maintenance
- Arranging for the connection of the agent tanks, refilling of tanks, and all system testing, including pressure tests

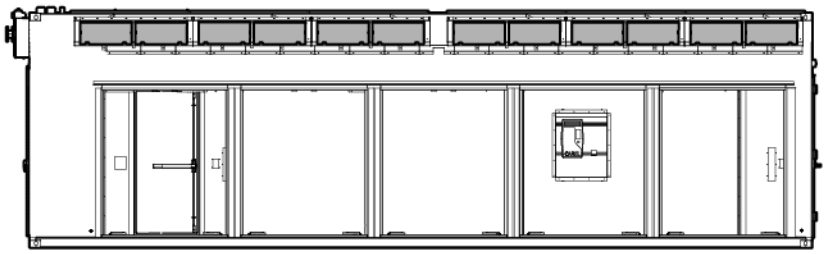
  All general maintenance of the suppression system must be completed by an authorized technician.
- General maintenance of the fire detection and suppression system must be completed by an authorized technician

  For more information, see the *HP Performance Optimized Datacenter 40c NA Maintenance and Service guide*.

Additional local requirements are not covered as part of the option price or basic installation and deployment services, unless specifically included in an executed Statement of Work.

Air filter

There are 2 air filters per cooling zone, for a total of 12 filters.

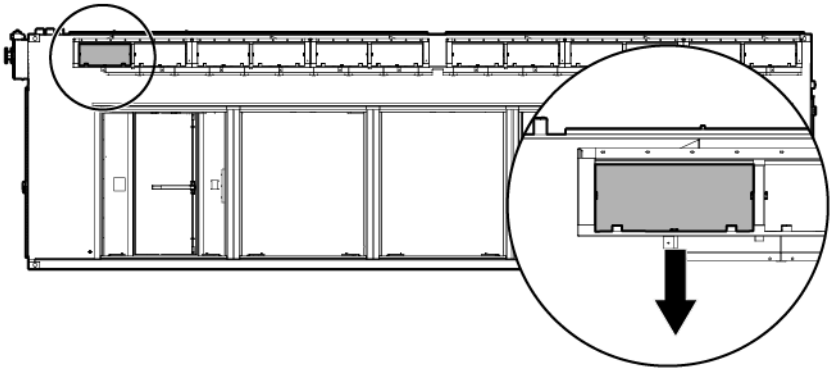


Tools are not required for installation.

Removing the air filter

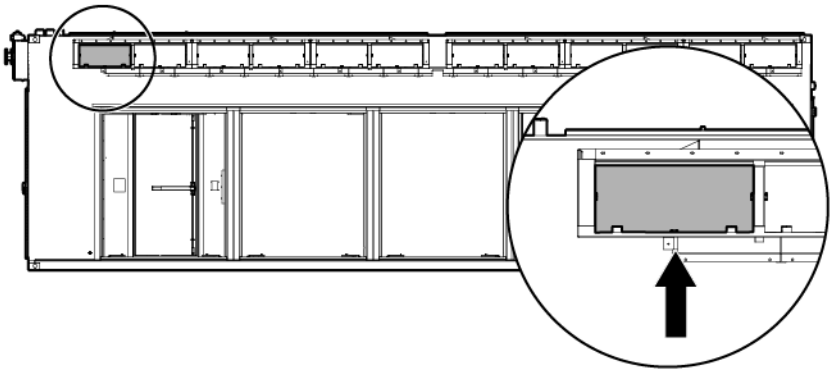
1. Pull the locking tabs away from the air filter to release the filter.

2. Pull the filter down through the frame channels to remove the filter.



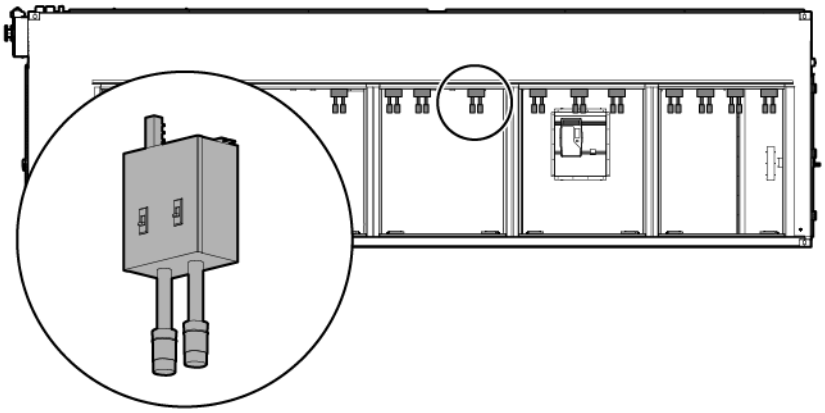
Replacing the air filter

1. Angle the filter to position the top corners in the frame channels, and then push the filter up to the top of the frame.
2. Press in the bottom corners of the filter until the locking tabs engage and the filter clicks into place.



Busway drop box

The internal electrical busways provide a location to connect each of the drop boxes, which then power the PDUs. Stagger the drop boxes on the electrical busways by connecting one drop box to busway #1 and connecting the next drop box to busway #2. A staggered configuration enables load balancing with the rack equipment and is necessary to ensure redundancy.

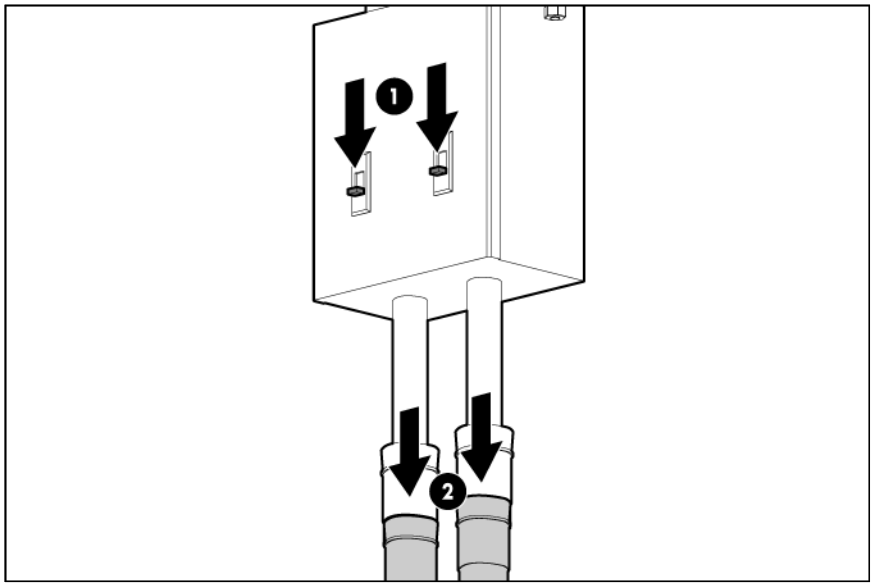


You need a socket wrench for installation.

IMPORTANT: HP recommends that you shut down the associated IT equipment and de-energize the appropriate section of the power busway before attempting to remove or replace a busway drop box. The corresponding branch circuit breaker is labeled on the busway.

Removing the busway drop box

1. Turn the power off by opening both breakers on the busway drop box (1).
2. Disconnect the PDUs that are connected to the busway drop box (2).

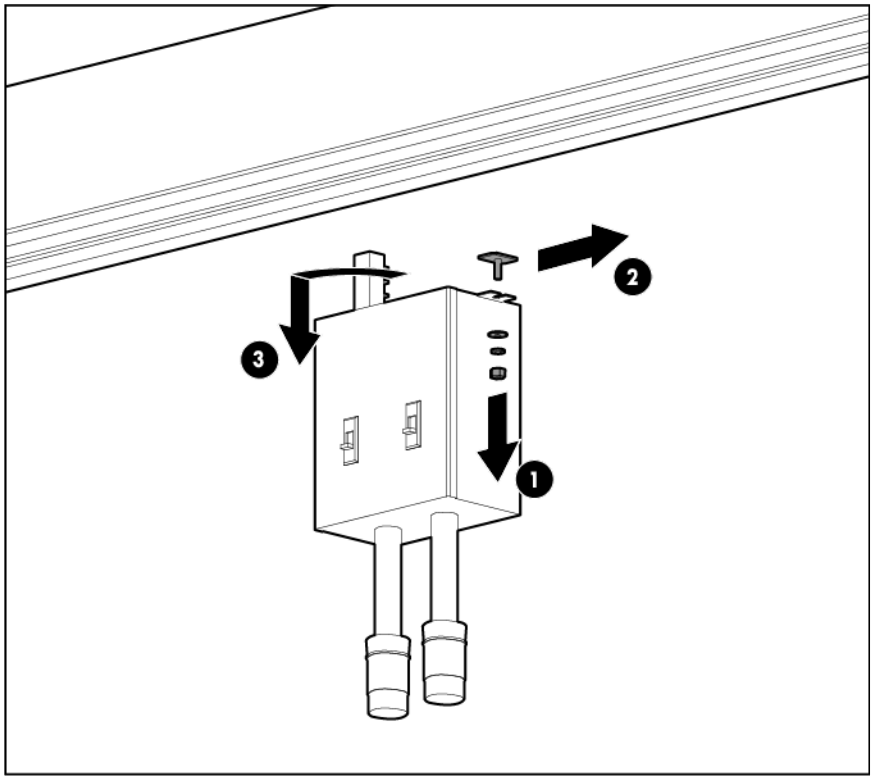


3. Use a socket wrench to loosen and remove the bolt securing the busway drop box to the retaining hardware bracket (1).

4. Slide the hardware bracket to the right along the busway, completely disconnecting it from the busway drop box (2).

   WARNING: Use caution when removing and replacing the busway drop box. The drop box weighs approximately 9 kg (20 lb).

5. Rotate the busway drop box 90° so that it is perpendicular to the electrical busway, and then remove the drop box from the electrical busway (3).



Replacing the busway drop box

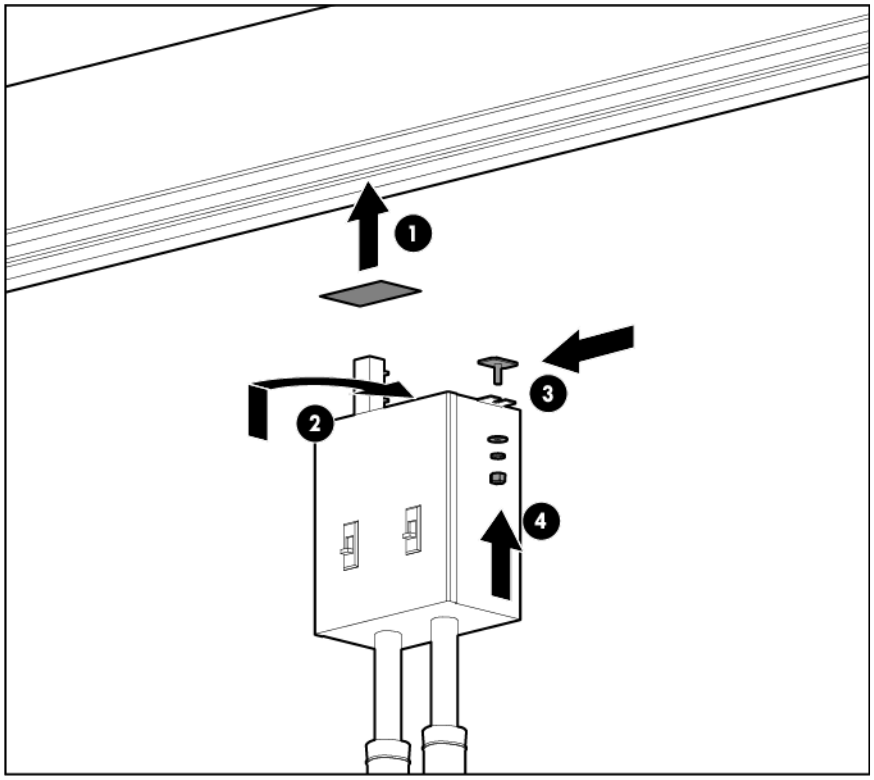
WARNING: Use caution when removing and replacing the busway drop box. The drop box weighs approximately 9 kg (20 lb).

1. Place the silver drop box bracket on the electrical busway where you want to replace the busway drop box (1).
2. Note the required rotation indicated on the drop box, insert the drop box into the drop box bracket on the electrical busway, and then rotate the drop box 90° until it locks into place (2).

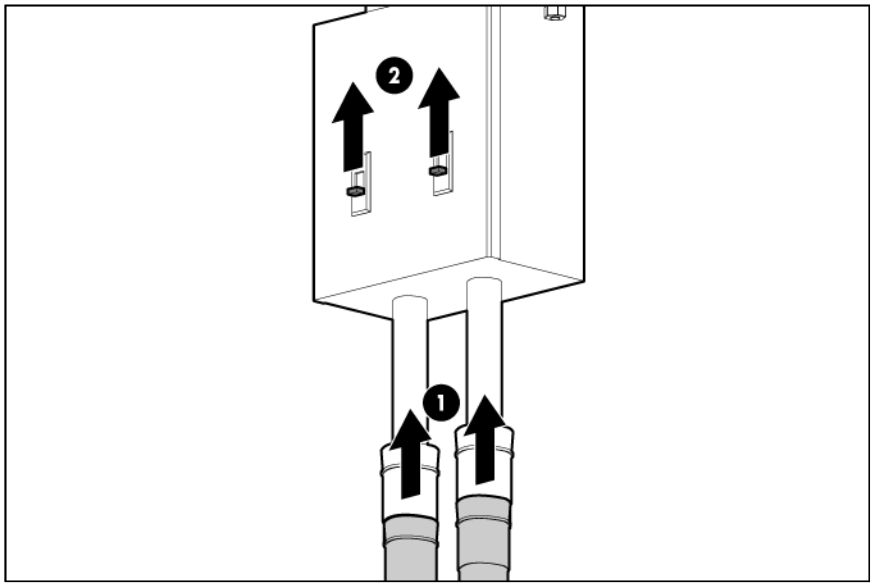
   CAUTION: To prevent damage to the drop box and make sure that the drop box engages properly, be sure that the drop box is completely flush to the busway. If a drop box is damaged during installation, do not attempt to re-engage or repair the drop box.

3. Slide the hardware bracket to the left along the busway until it connects to the drop box (3).

4. Secure the busway drop box to the retaining hardware bracket by using a socket wrench to insert and tighten a bolt (4).



5. Connect the PDUs to the busway drop box (1).
6. Turn the power on by closing both breakers on the busway drop box (2).



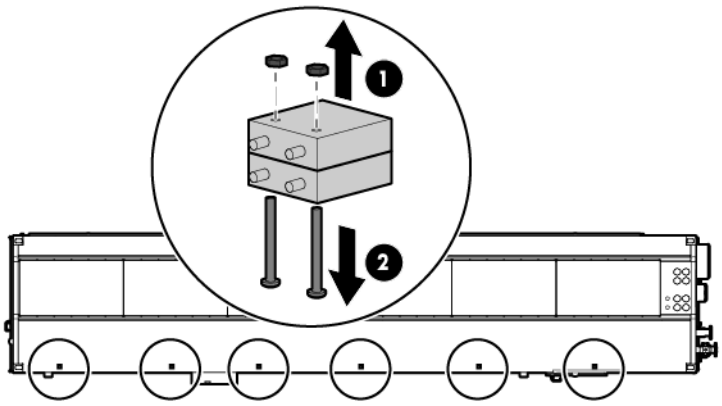
Differential pressure sensor

The differential pressure sensors are located in the cold aisle.

You need a screwdriver for installation.

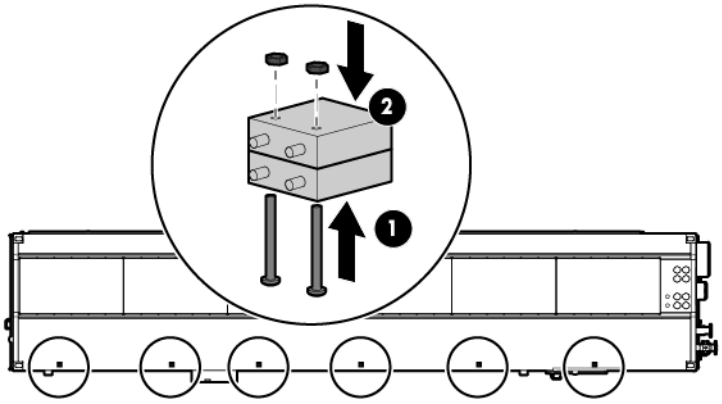
Removing the differential pressure sensor

1. Label the pressure sensor tube connection locations, and then remove the tubes from the differential pressure sensor.
2. Label the sensor wire connection locations, loosen the screws securing the sensor wires, and then remove the sensor wires.
3. Remove the two nuts (1) and two bolts (2) securing the differential pressure sensor, and then remove the differential pressure sensor.



Replacing the differential pressure sensor

1. Replace the differential pressure sensor, and then secure the differential pressure sensor with two bolts (1) and two nuts (2).



2. Insert the pressure sensor tubes into the differential pressure sensor according to the connection locations you labeled during the removal procedure.
3. Replace the sensor wires according to the connection locations you labeled during the removal procedure, and then secure the sensor wires by tightening the screws.

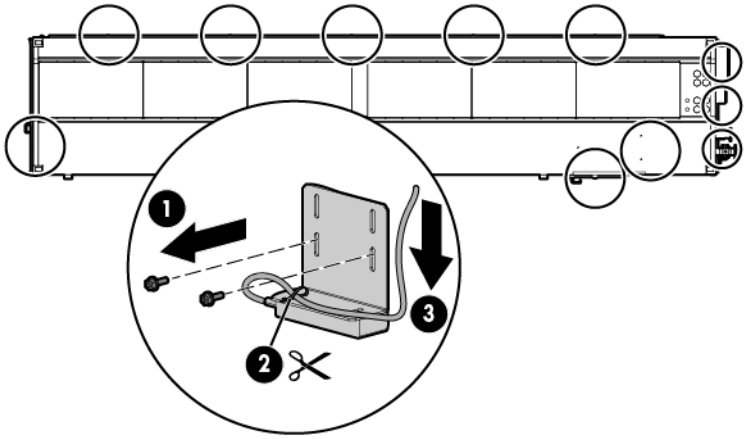
Door position contact

Door position contacts are located on all doors and cabinets.

You need a screwdriver and scissors for installation.

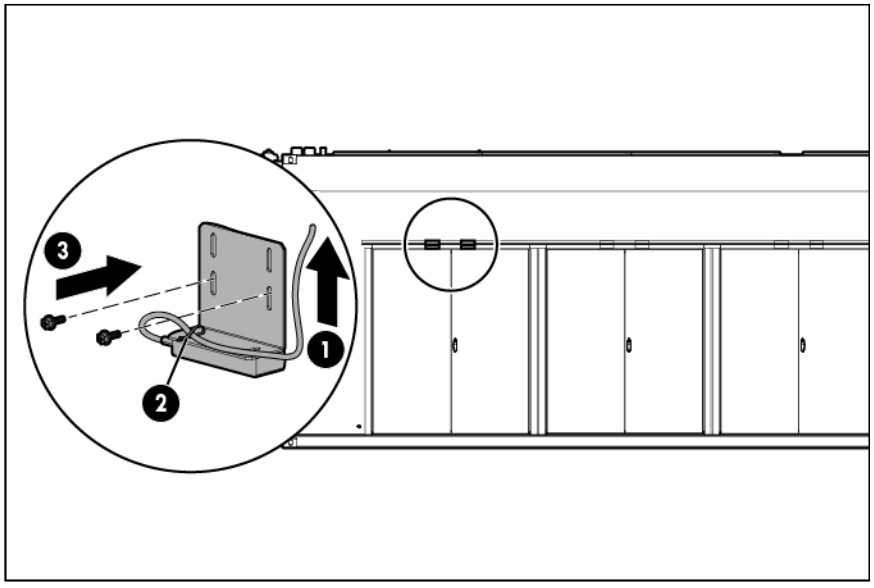
Removing the door position contact

1. Remove the two screws securing the upper magnet (1).
2. Cut the tie wrap (2) and loosen the nut on the HP POD 40c NA structure that secures the wire.
3. Pull the wire all the way through to the point of entry or ECS panel (3).



Replacing the door position contact

1. Feed the wire all the way through from the point of entry or ECS panel (1).
2. Tighten the nut on the HP POD 40c NA structure that secures the wire, and then replace the tie wrap (2).
3. Secure the magnet to the bracket using two screws (3).



Drain pan sensor

The HP POD 40c NA includes six heat exchanger condensate drains. One drain pan sensor is located in the drain tray below each set of heat exchangers.

Two sensors are also located in the header drain pans, one in cooling zone 2 and one in cooling zone 5.

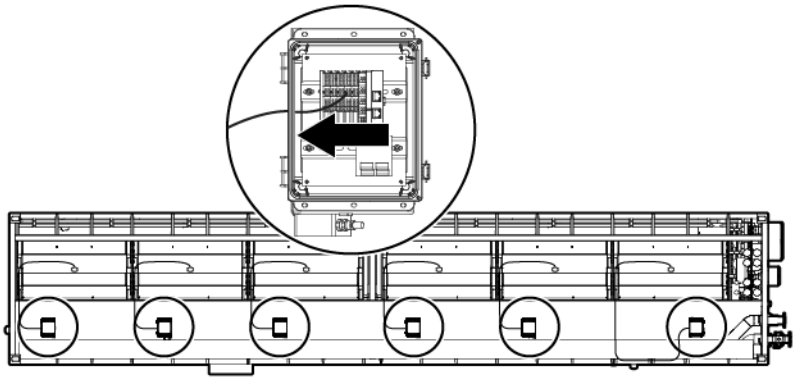
The normally-open circuit is closed when the probes of the drain pan sensor become wet, which allows 24 VDC to travel back to the ECS panel and trigger the alarm.

You need a screwdriver for installation.

Removing the drain pan sensor

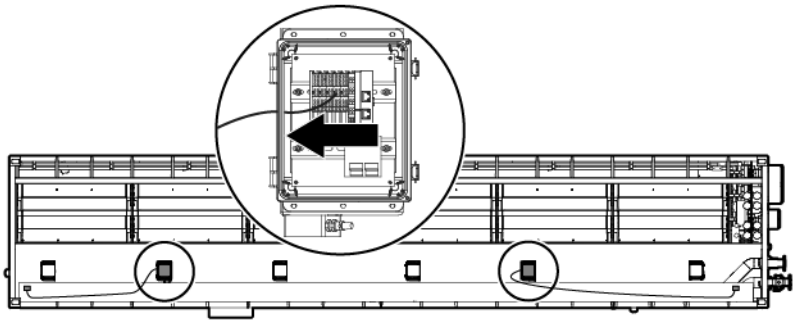
1. If you are removing a heat exchanger drain pan sensor, do the following:
   a. Inspect the area by removing the center, bottom fan from the center fan bank in the associated zone. For more information, see "Removing the fan."
   b. To gain additional working space, you might need to remove a fan bank in the associated zone. For more information, see "Removing the fan bank."
2. Follow the sensor wire to the associated satellite box. Disconnect the wire from the satellite box terminal and note the wire location.

   Heat exchanger drain pan sensor



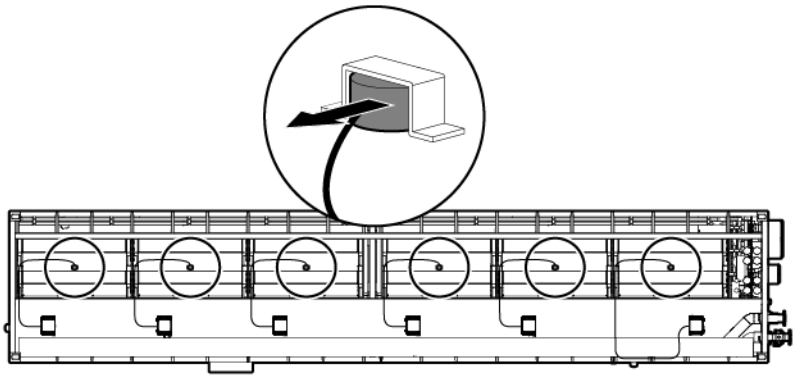
   -or-

   Header drain pan sensor



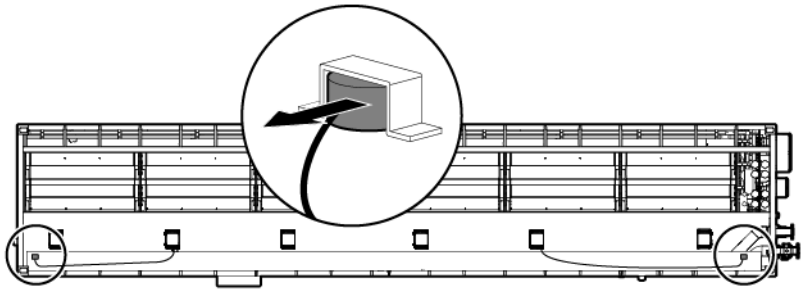
3. Pull the wire through from the satellite box to the sensor location, and then remove the sensor.

Heat exchanger drain pan sensor



-or-

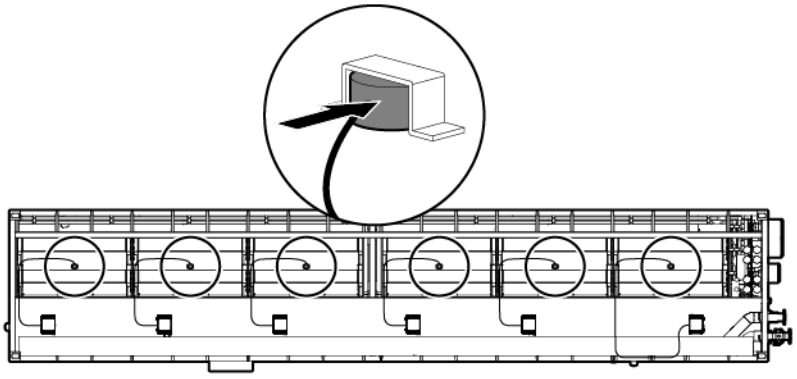
Header drain pan sensor



Replacing the drain pan sensor

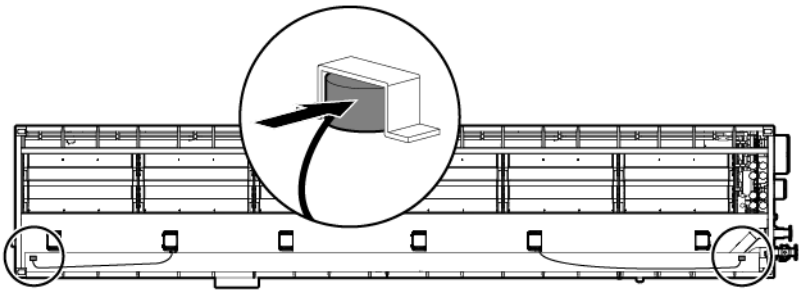
1. Position the sensor in the drain pan.

   Heat exchanger drain pan sensor



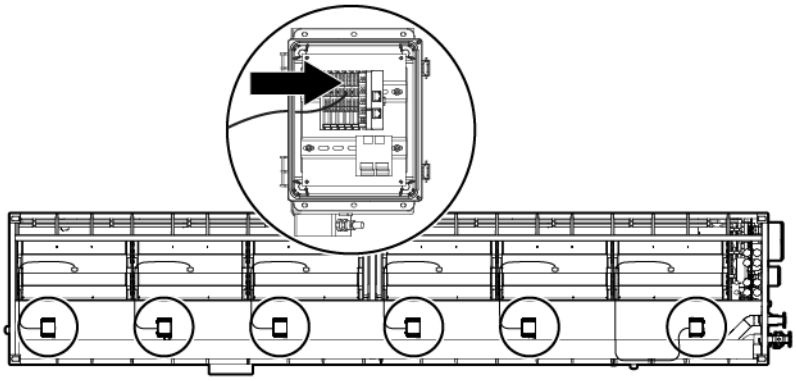
-or-

Header drain pan sensor



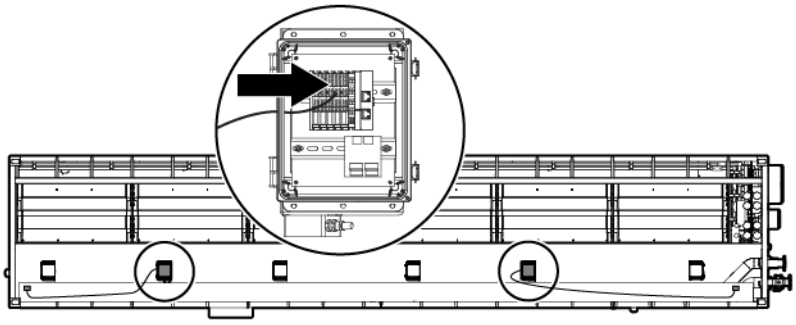
2. Route the wire through the flex tubing to the associated zone satellite box.
3. Connect the sensor wire to the appropriate port on the satellite box terminal.

   Heat exchanger drain pan sensor



   -or-

   Header drain pan sensor



4. If you are replacing a heat exchanger drain pan sensor, do the following:
   a. Replace the fan bank you removed, if applicable. For more information, see "Replacing the fan bank."
   b. Replace the fan you removed, if applicable. For more information, see "Replacing the fan."

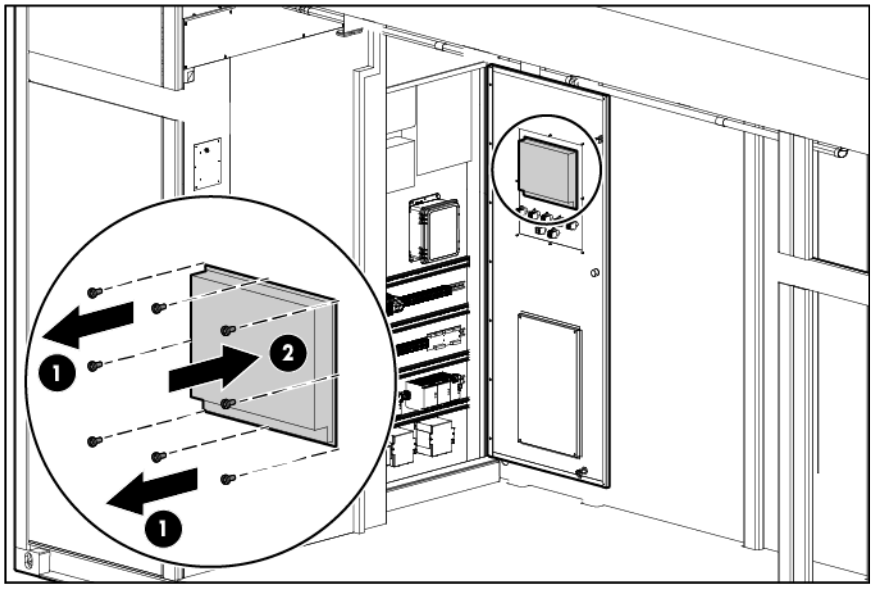
ECS touchscreen

The ECS touchscreen is located on the door to the control panel inside the cold aisle of the HP POD 40c NA.

You need a screwdriver for installation.

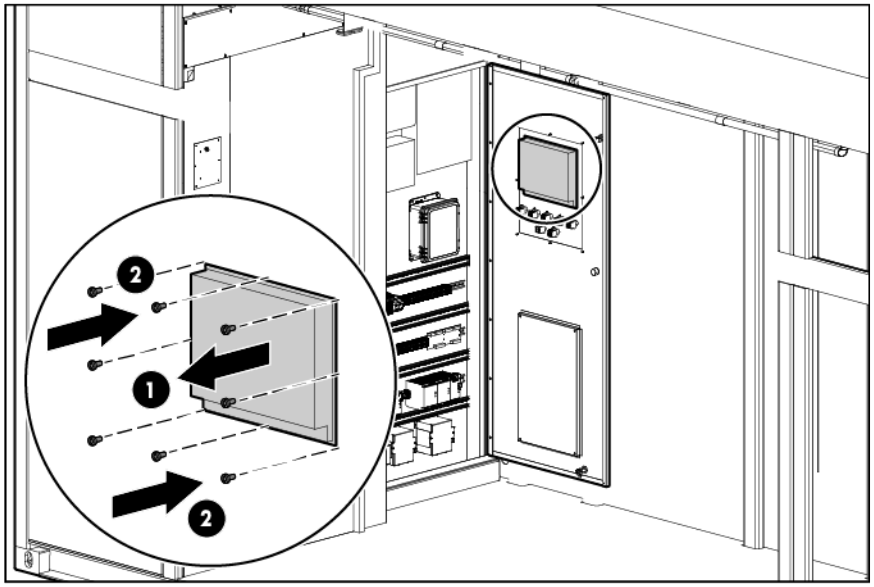
Removing the ECS touchscreen

1. Disconnect the cables attached to the back of the ECS touchscreen.
2. Remove the eight screws on the back of the door that secure the ECS touchscreen (1), and then push the ESC touchscreen through the front of the door to remove the ECS touchscreen (2).



Replacing the ECS touchscreen

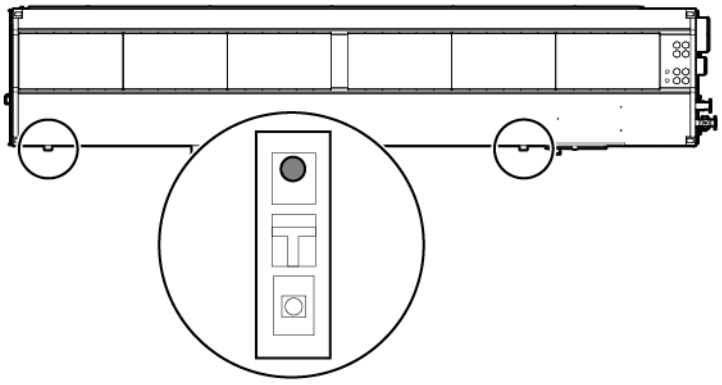
1. Replace the ESC touchscreen through the front of the door (1), and then secure the ECS touchscreen to the back of the door with eight screws (2).



2. Connect the cables to the back of the ECS touchscreen.

EPO button

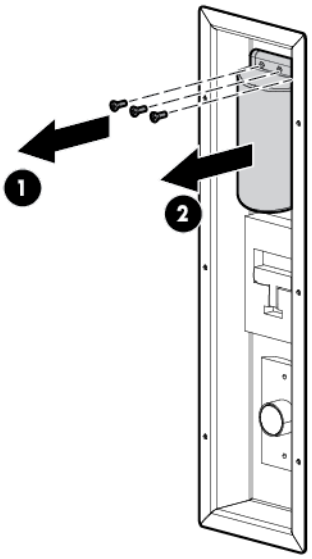
There are two EPO buttons, one by each personnel access door in the HP POD 40c NA.



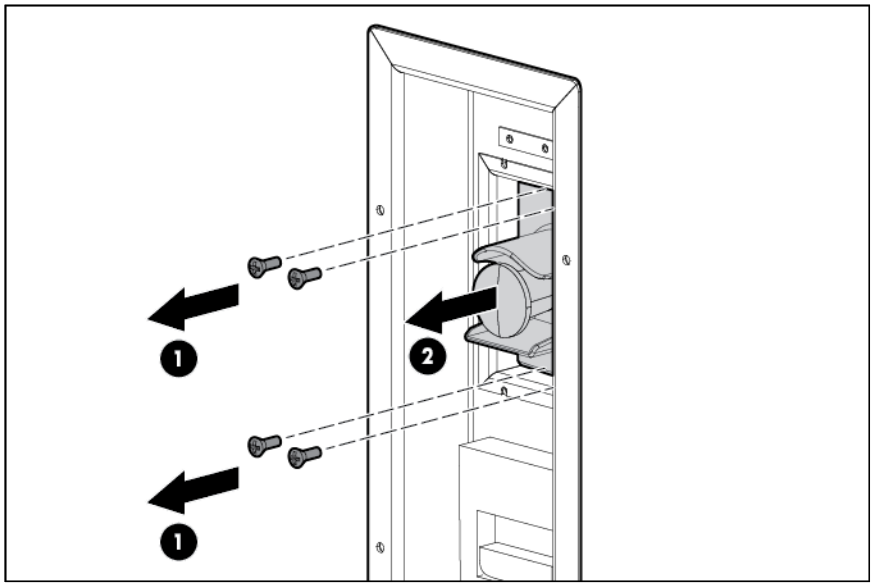
You need a screwdriver for installation.

Removing the EPO button

1. Remove the two screws securing the tamper cover (1), and then remove the tamper cover (2).

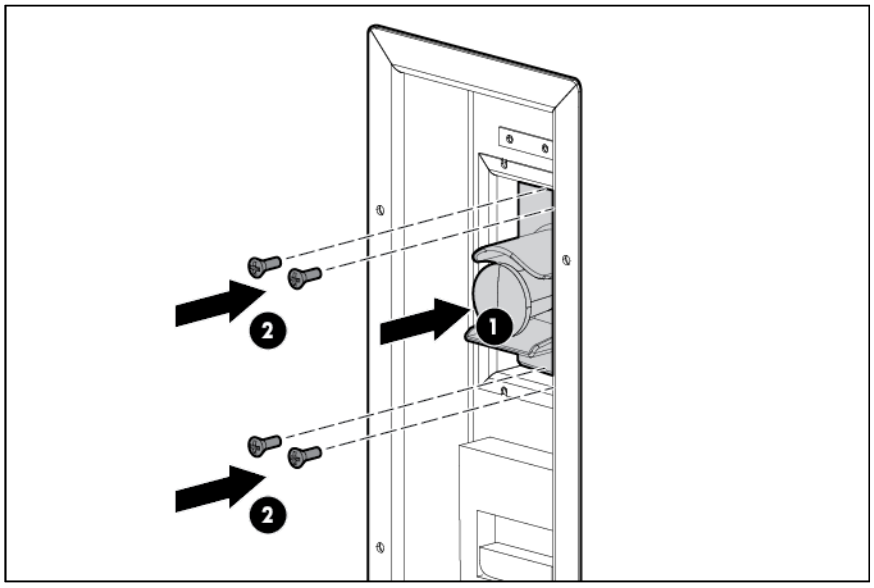


2. Remove the four screws securing the EPO button (1), and then remove the EPO button (2).

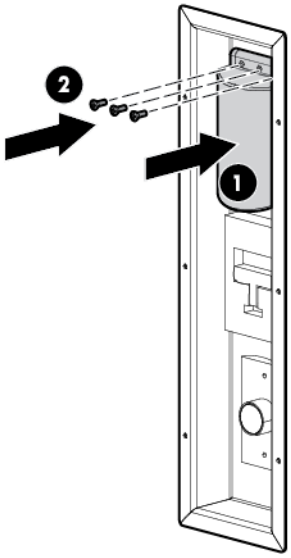


Replacing the EPO button

1. Replace the EPO button (1), and then replace the four screws that secure the EPO button (2).

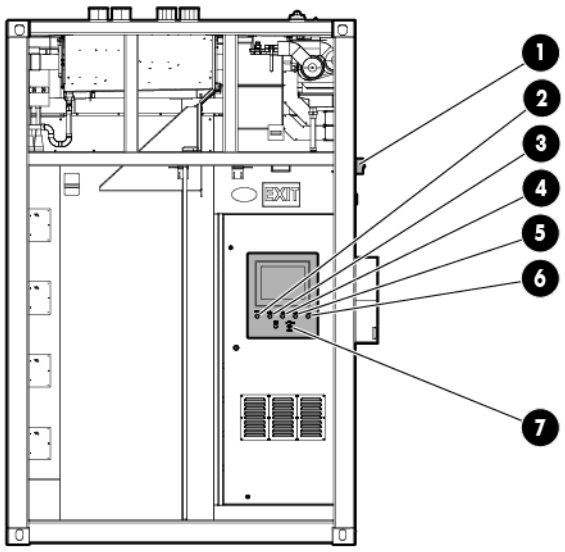


2. Replace the tamper cover (1), and then replace the two screws that secure the tamper cover (2).



EPO LED indicators

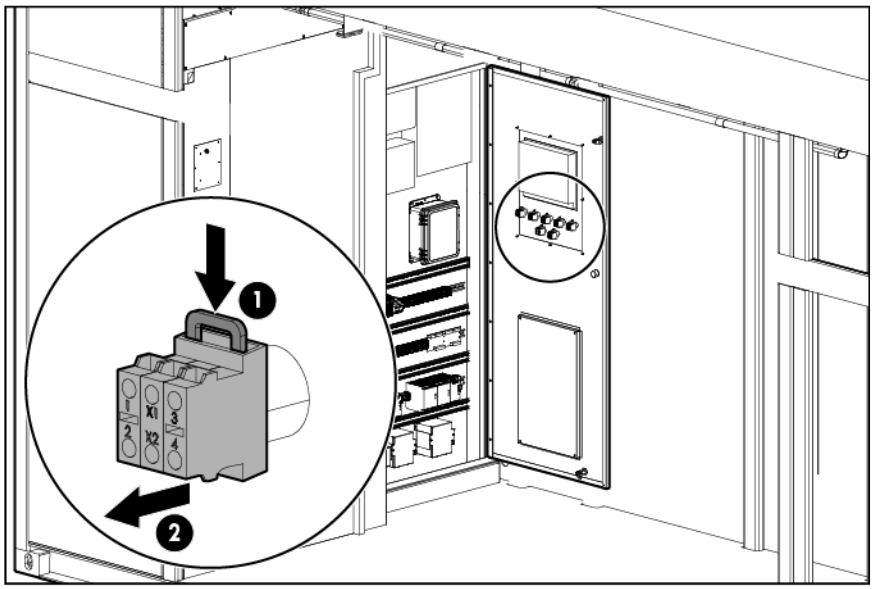
The ECS cabinet contains white (1, 2, 6, 7), red (1,3), yellow (1,5), and green (4) EPO LED indicators.



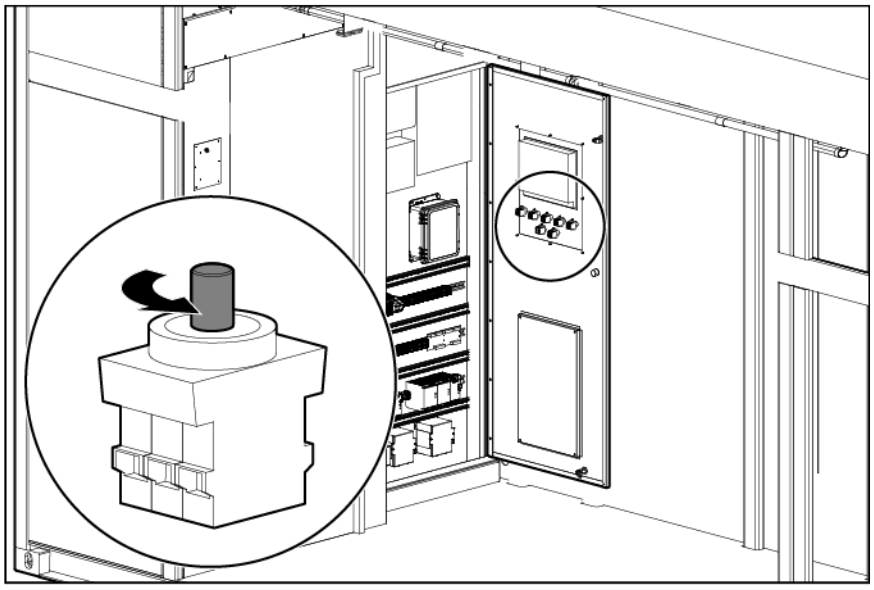
Tools are not required for installation.

Removing the EPO LED indicator

1. On the back of the ECS cabinet door, push the gray tab on the EPO LED indicator module down to release the module (1), and then pull the module out of the door (2).

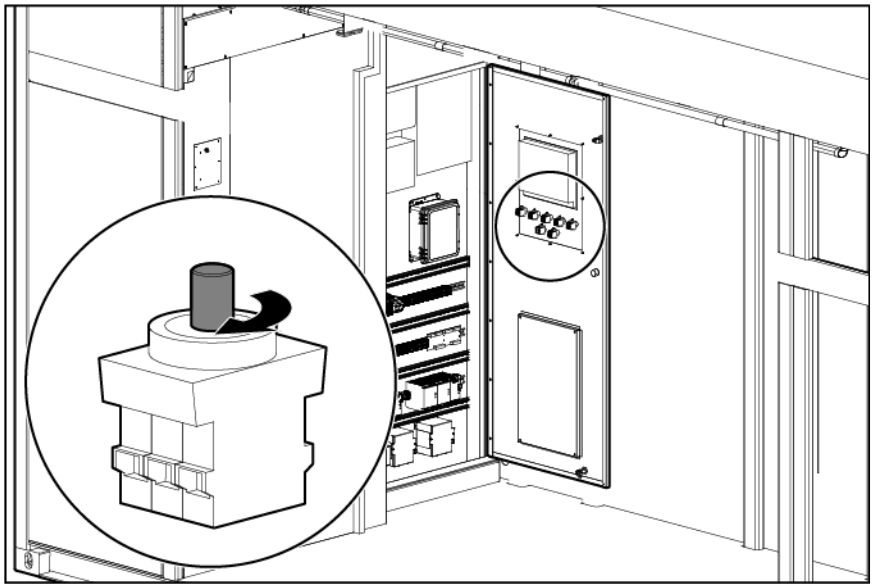


2. Unscrew the EPO LED indicator bulb.

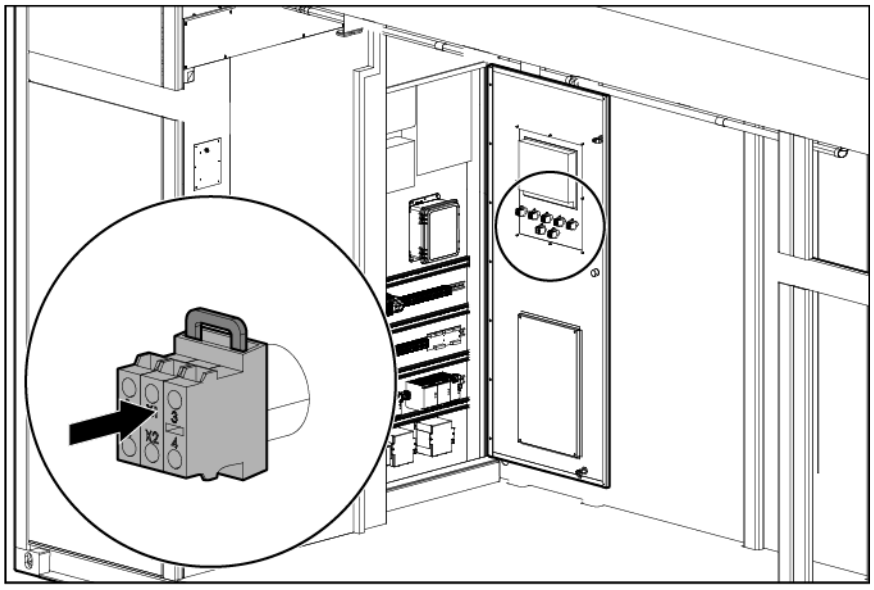


Replacing the EPO LED indicator

1. Screw the new EPO LED indicator bulb into the module.



2. Push the module into the slot on the back of the ECS cabinet door until it clicks into place.



EPO thermister

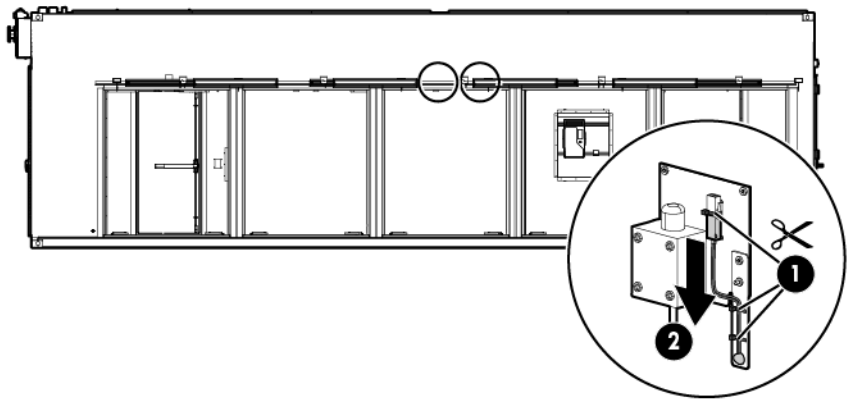
Two EPO thermisters are located in the hot aisle, both in zone 4.

While the thermisters are not technically at-temperature monitoring devices, when the hot aisle temperature reaches 60°C (140°F), the thermister switch closes. When both thermister switches are closed, the EPO system initiates an emergency shutdown.

You need scissors for installation.

Removing the EPO thermister

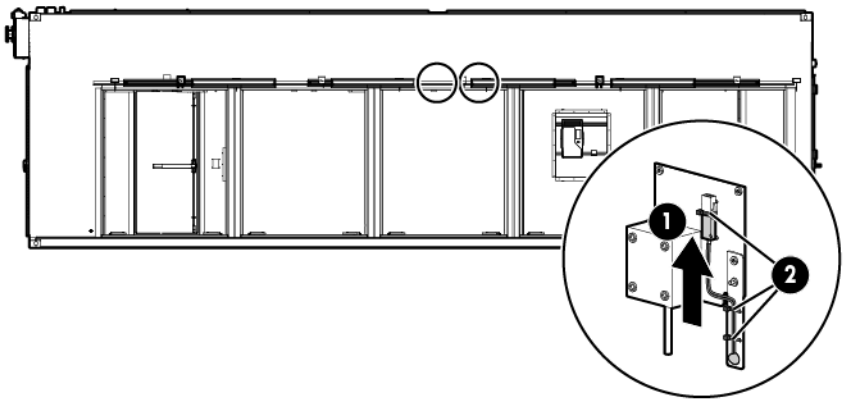
1. Cut the tie wraps securing the thermister (1).
2. Pull the thermister down to remove the thermister (2).



Replacing the EPO thermister

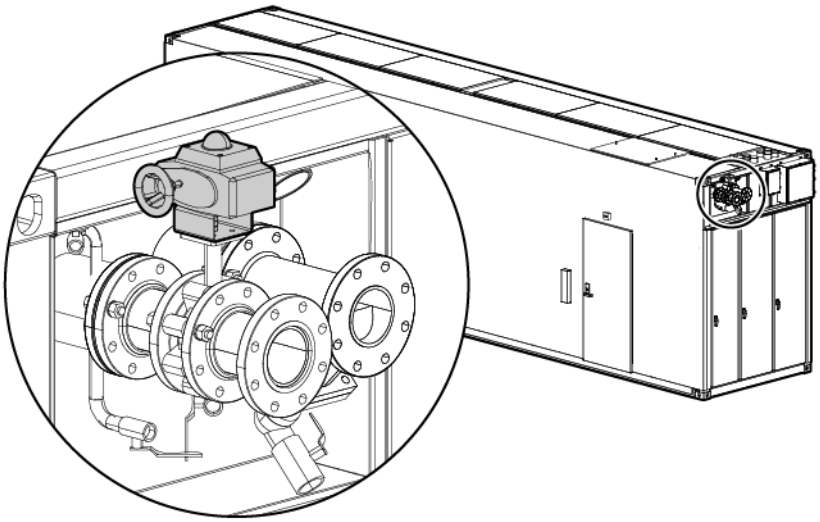
1. Insert the replacement thermister (1).

2. Secure the thermister with tie wraps (2).



External chilled water flow actuator

The external chilled water flow actuator is located on top of the HP POD 40c NA.

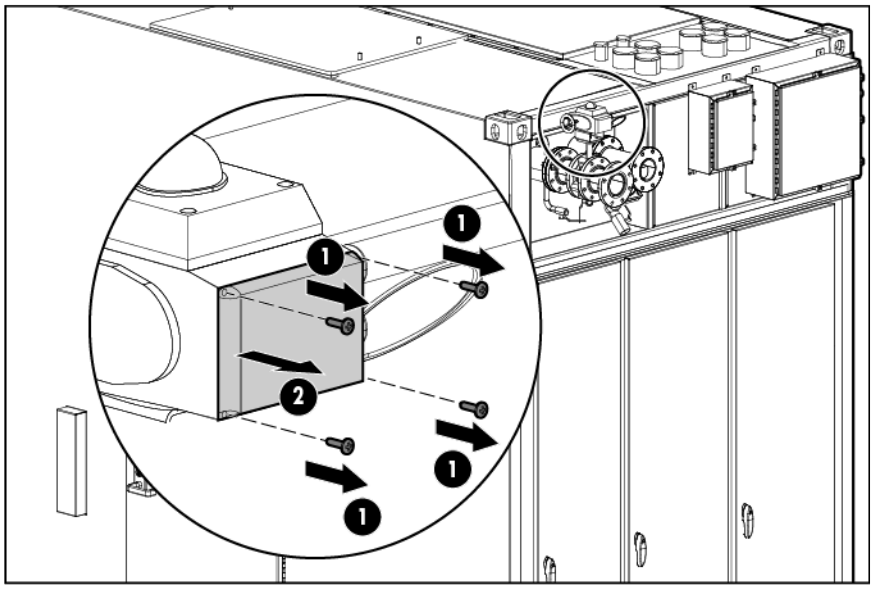


You need a wrench for installation.

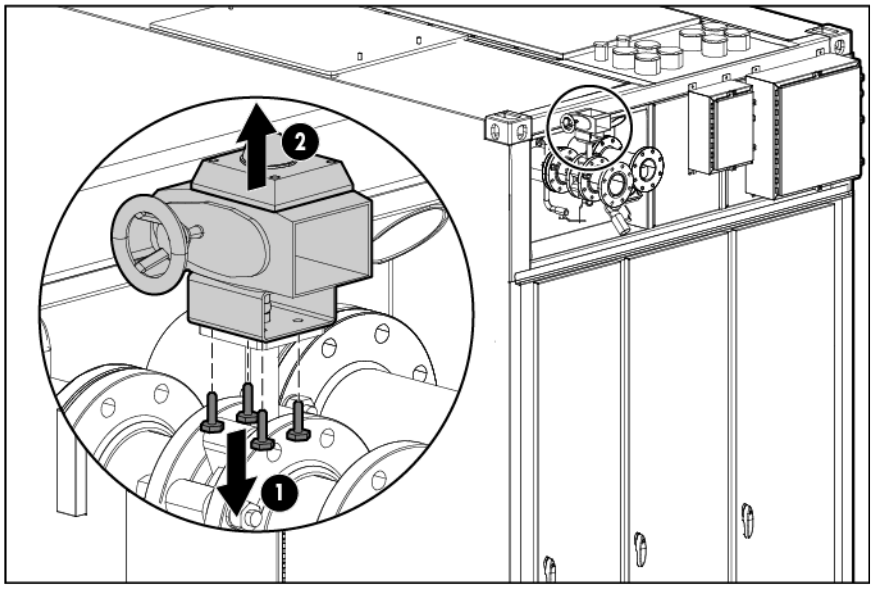
Removing the external chilled water flow actuator

1. Open and danger tag the associated circuit breaker in the ECS cabinet. The circuit breakers are identified on the panel schedule.

2. Remove the four bolts securing the face plate (1), and then remove the face plate (2).

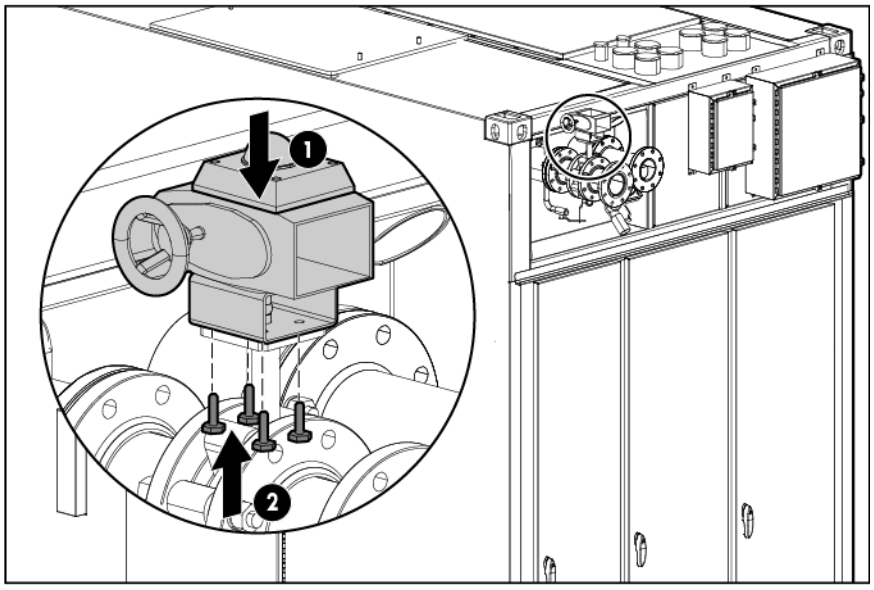


3. Disconnect the power to the actuator.
4. Remove the four bolts securing the actuator (1), and then remove the actuator (2).

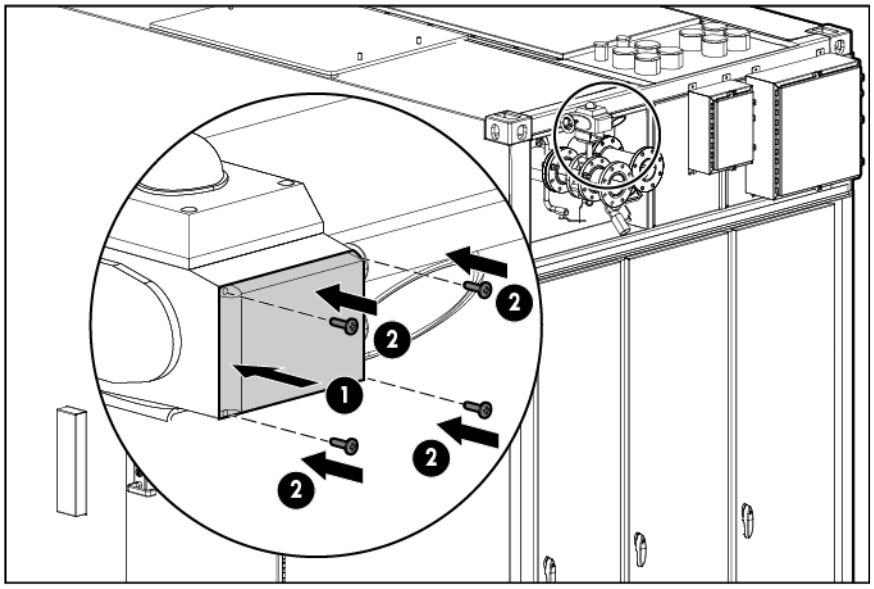


Replacing the external chilled water flow actuator

1. Replace the actuator (1), and then secure the actuator using four bolts (2).



2. Connect the power to the actuator.
3. Replace the actuator face plate (1), and then secure the face plate with four bolts (2).



4. Close the associated circuit breaker in the ECS cabinet.

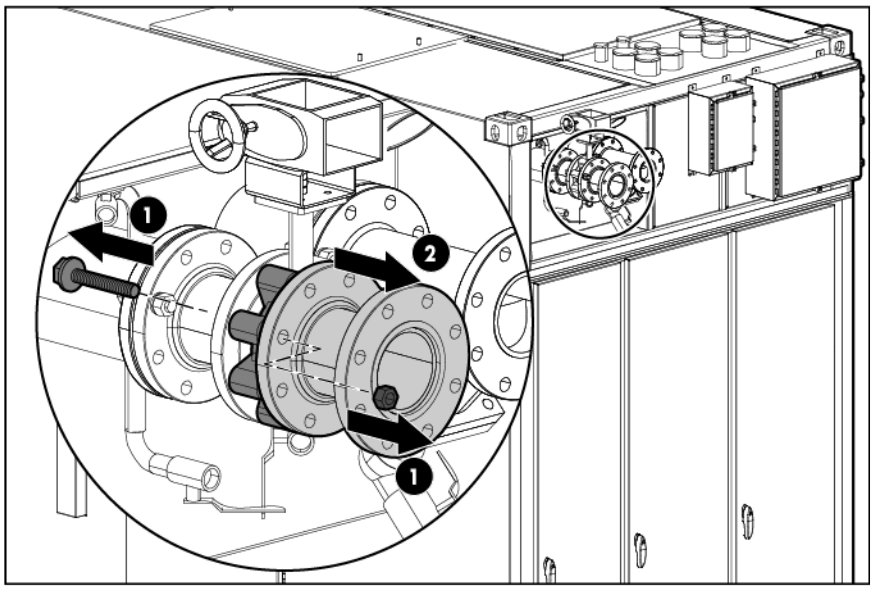
External chilled water flow valve

The external chilled water flow valve is the butterfly valve located on top of the HP POD 40c NA.

You need a wrench for installation.

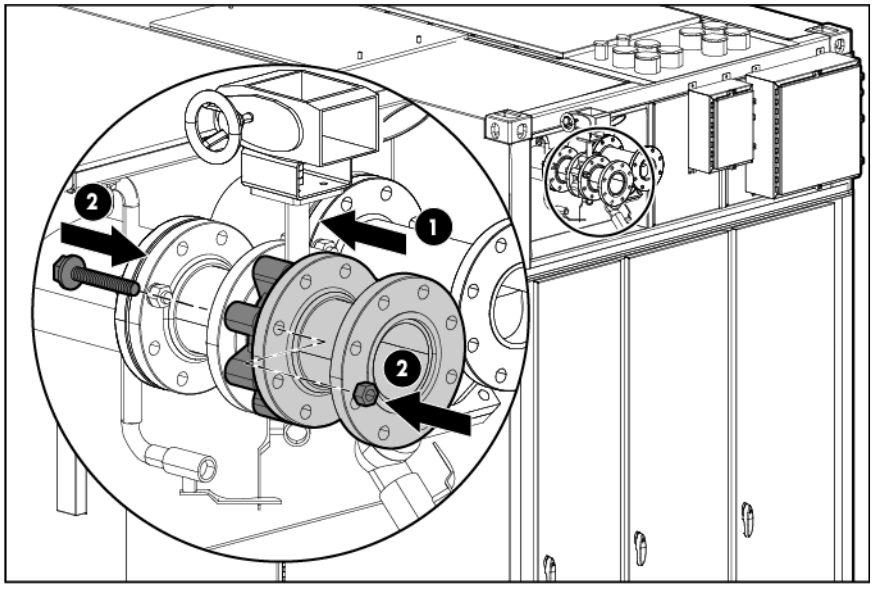
Removing the external chilled water flow valve

1. Remove the external chilled water flow actuator. For detailed instructions, see "Removing the external chilled water flow actuator (on page 33)."
2. Remove the eight bolts surrounding the valve (1), and then remove the valve (2).



Replacing the external chilled water flow valve

1. Replace the valve (1), and then secure the valve with eight bolts (2).



2. Replace the external chilled water flow actuator. For detailed instructions, see "Replacing the external chilled water flow actuator (on page 35)."

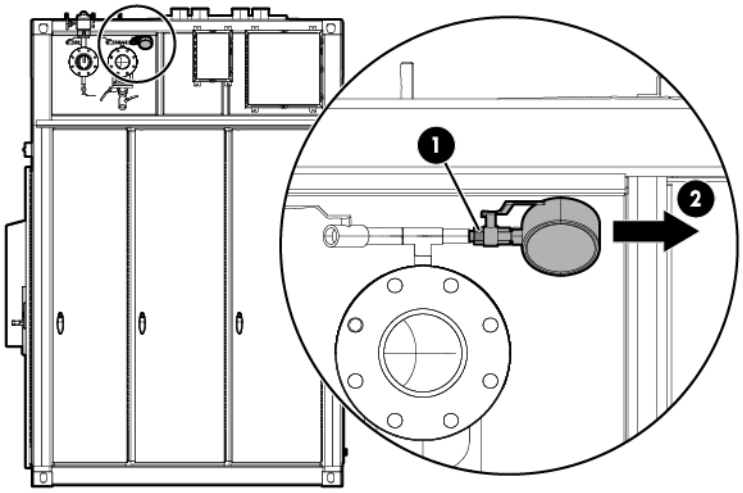
External pressure gauge isolation valve

The external pressure gauge isolation valve is located on top of the HP POD 40c NA.

You need an adjustable wrench or an appropriately sized box wrench for installation.

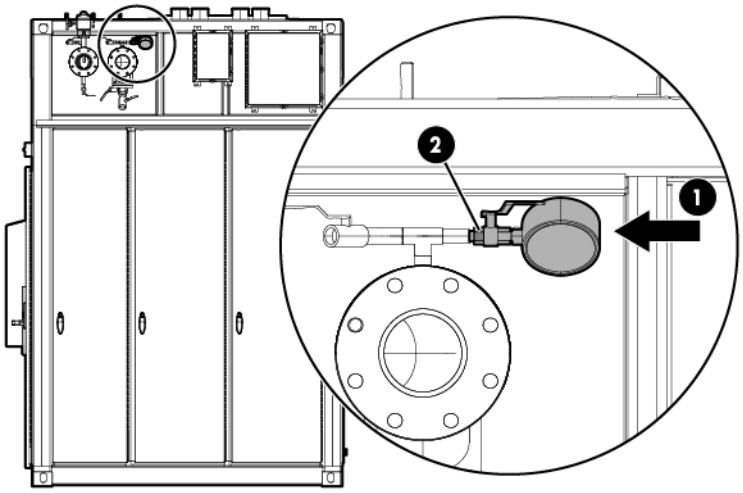
Removing the external pressure gauge isolation valve

Loosen the connection securing the valve (1), and then remove the valve (2).



Replacing the external pressure gauge isolation valve

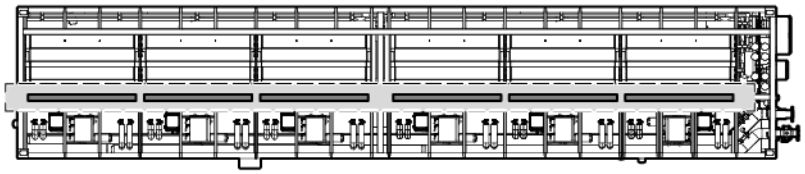
Insert the new valve (1), and then tighten the connection (2).



Fan

There are 18 fans per cooling zone.

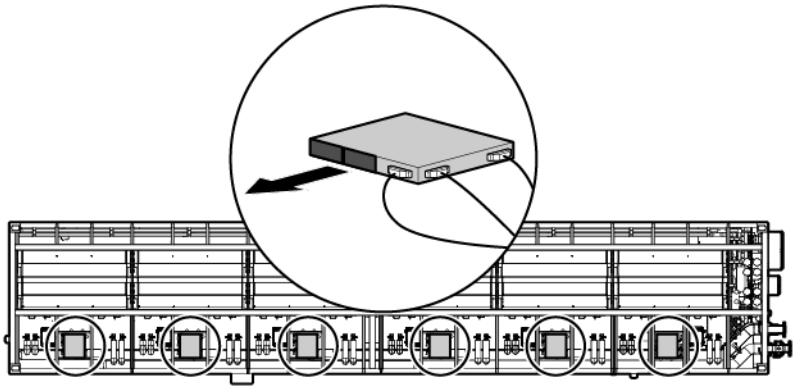
CAUTION: Power must be removed from the fan power assembly before removing or replacing a fan or fan bank.



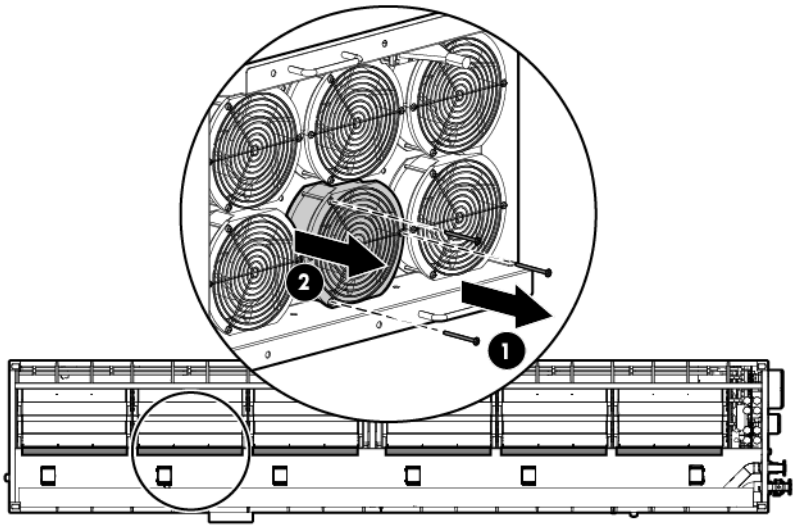
You need a screwdriver for installation.

Removing the fan

1. Take manual control of the fan speed in the affected zone from the ECS panel.
2. Set the fan speed to zero.
3. Unseat both power supplies from the fan power assembly.



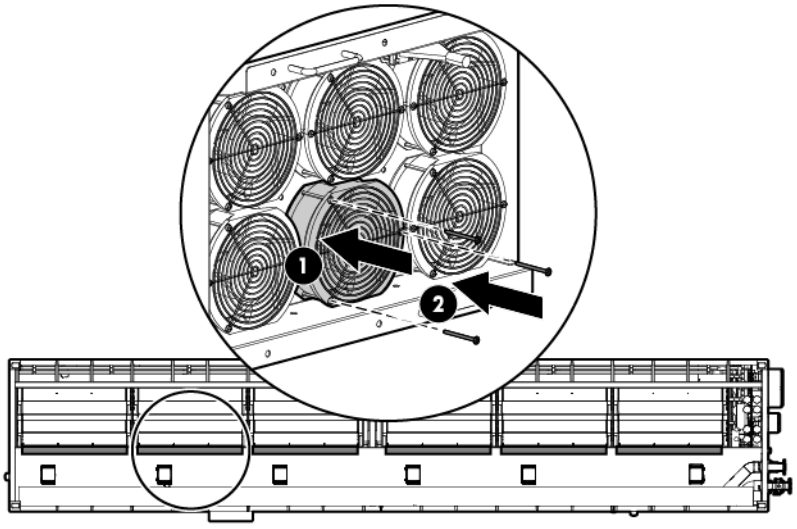
4. Remove the three screws that secure the fan in the assembly (1), and then partially remove the fan by pulling it straight out (2).



5. Disconnect the wire.
6. Remove the fan from the assembly.

Replacing the fan

1. Connect the wire.
2. Insert the fan into the assembly and push until the fan is fully seated (1).
3. Secure the fan with three screws (2).

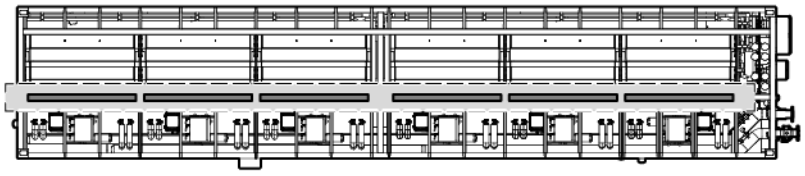


4. Connect the power supplies to the fan power assembly.
5. Return the fan bank to the AUTO mode of operation.

Fan bank

There are three fan banks per cooling zone.

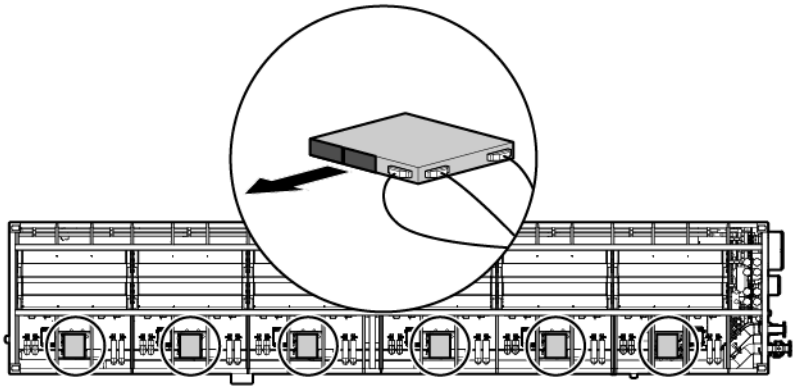
CAUTION: Power must be removed from the fan power assembly before removing or replacing a fan or fan bank.



You need a screwdriver for installation.

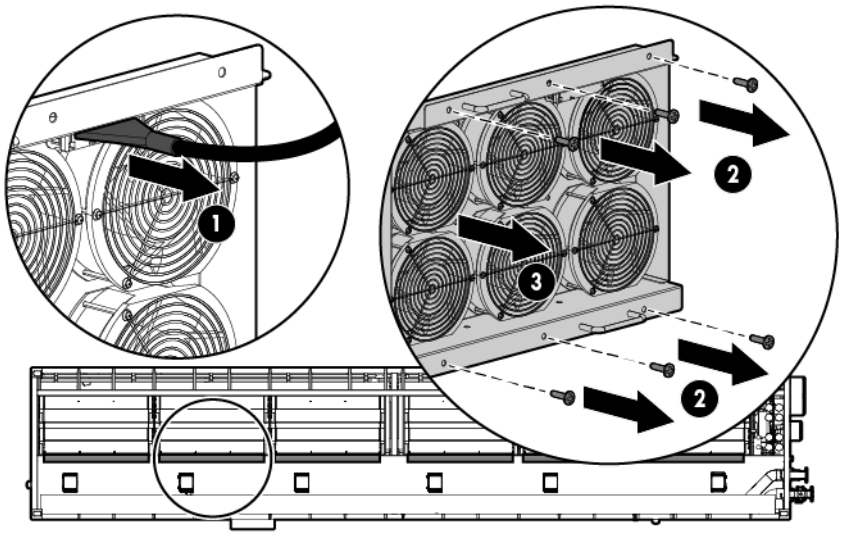
Removing the fan bank

1. Take manual control of the fan speed in the affected zone from the ECS panel.
2. Set the fan speed to zero.
3. Unseat both power supplies from the fan power assembly.



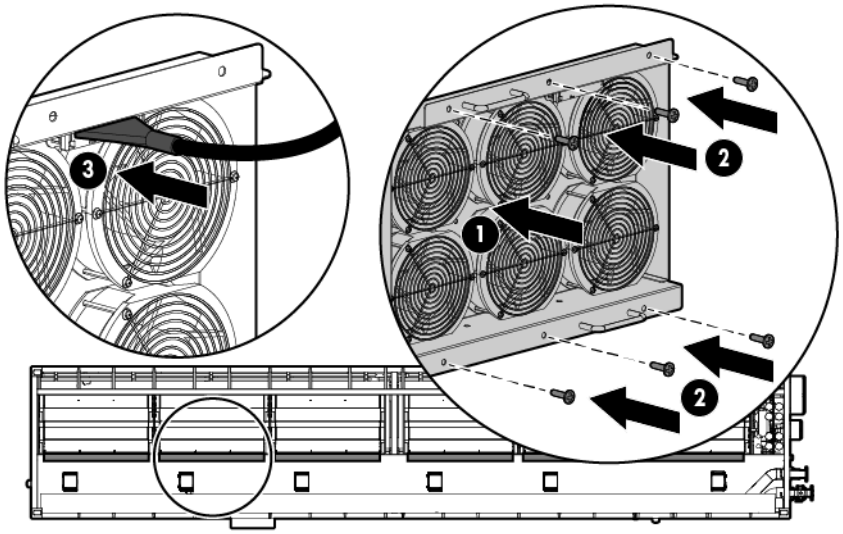
4. Remove the fan bank wire harness (1).
5. Remove the six screws that secure the fan bank (2).

6. Remove the fan bank by pulling it straight out (3).



Replacing the fan bank

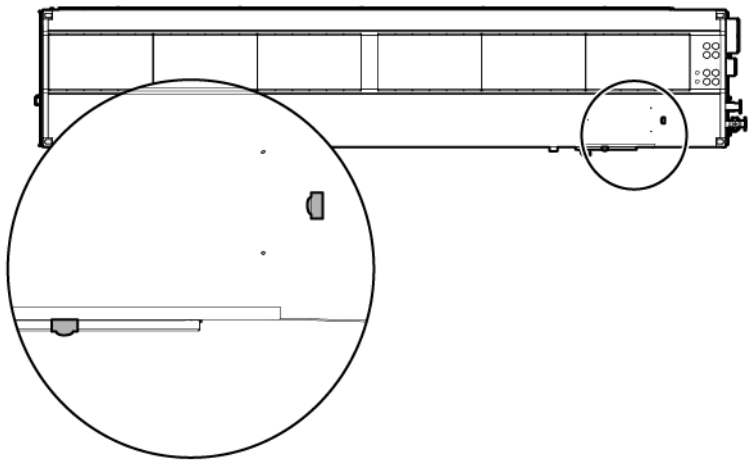
1. Insert the fan bank (1).
2. Secure the fan bank with six screws (2).
3. Replace the fan bank wire harness (3).



4. Connect the power supplies to the fan power assembly.
5. Return the fan bank to the AUTO mode of operation.

Fire strobe light

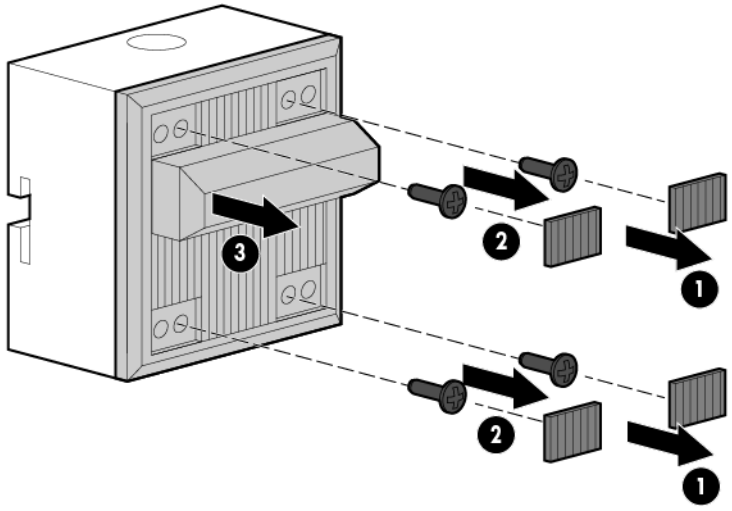
The HP POD 40c NA contains an internal fire alarm strobe light in the cold aisle and an external fire alarm strobe light at the standard personnel entry door.



You need a screwdriver for installation.

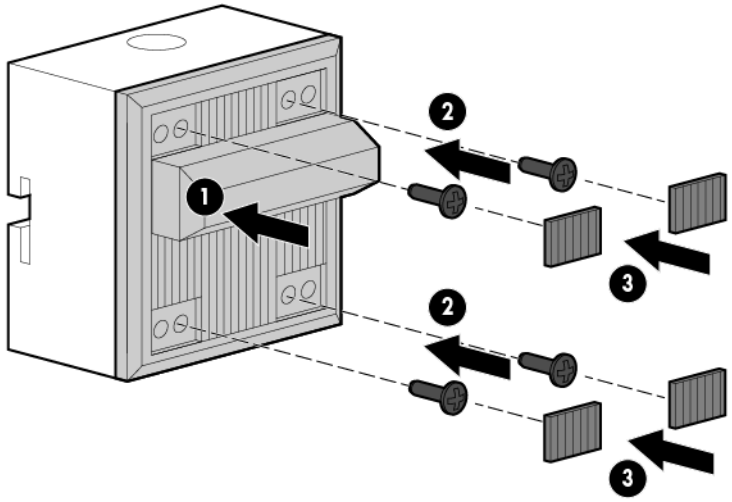
Removing the fire strobe light

1. Remove the four screw cover plates (1).
2. Remove the four screws securing the components (2), and then disconnect the wiring.
3. Remove the electric sounder with strobe, the semi-flush plate, and the standard back box (3).



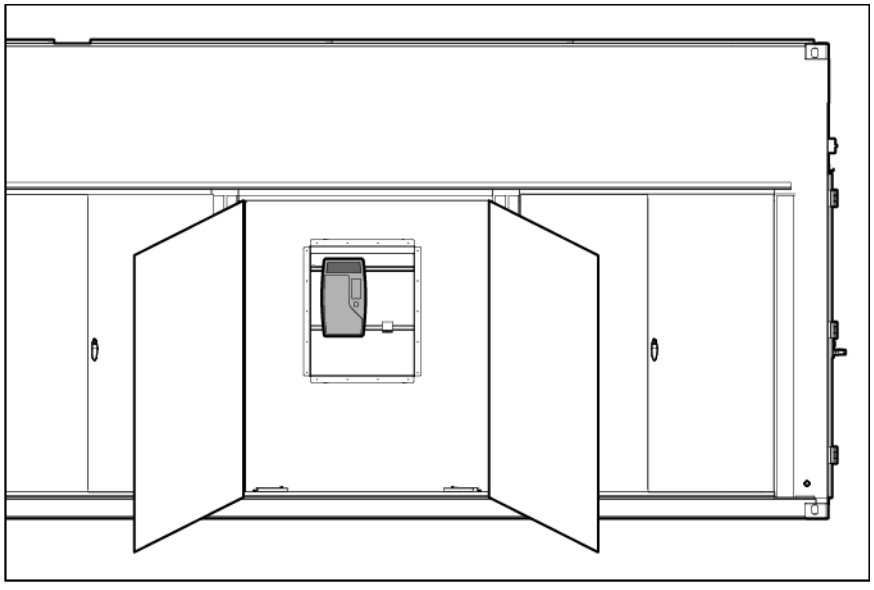
Replacing the fire strobe light

1. Assemble the standard back box, the semi-flush plate, and the electric sounder with strobe (1), and then attach the wiring.
2. Secure the components with four screws (2).
3. Attach the four screw cover plates (3).



Humidifier

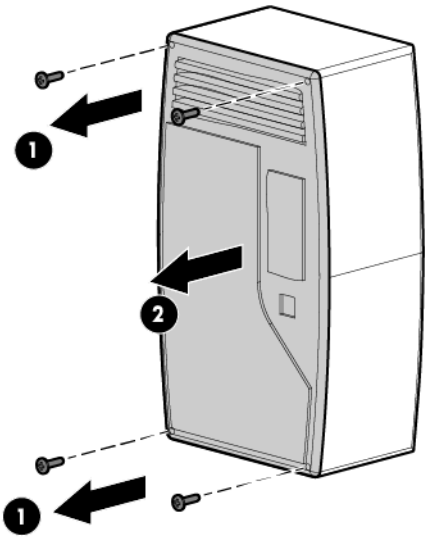
The humidifier is located in the cold aisle humidifier bump out.



You need a screwdriver for installation.

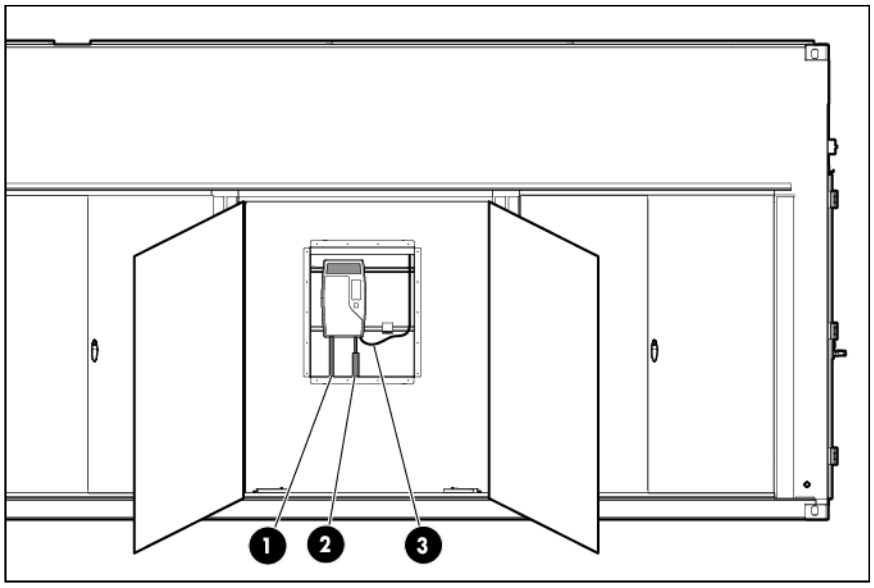
Removing the humidifier

1. Hold the drain button on the humidifier exterior until the humidifier cylinder drains completely.
2. Press the power button on the outside of the humidifier to power down the humidifier.
3. Close the water supply isolation valve on the HP POD 40c NA exterior.
4. Disconnect the water supply line to the humidifier on the HP POD 40c NA exterior to relieve the water pressure.
5. Open and danger tag the associated circuit breaker in the ECS cabinet. The circuit breakers are identified on the panel schedule.
6. Remove the four screws on the corners of the humidifier cover (1), and then remove the cover (2).

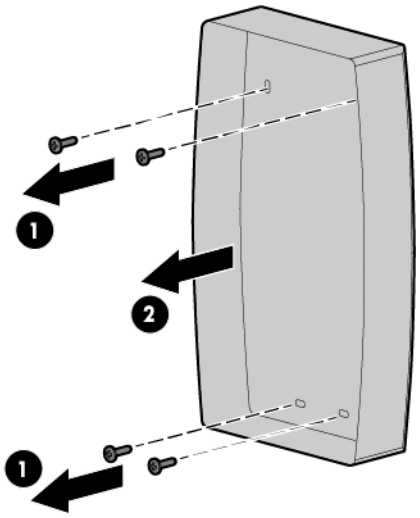


7. Locate the power board and disconnect the two internal electrical wires.
8. Disconnect the drain (1).
9. Disconnect the humidifier from the water supply line (2).

10. Disconnect and remove the external electrical wiring from the housing (3).

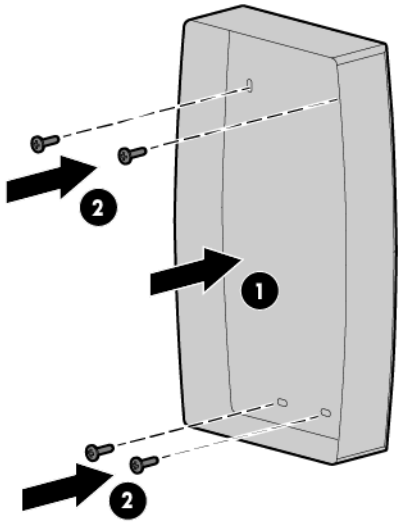


11. Remove the four screws that secure the humidifier body to the wall (1), and then remove the humidifier (2).

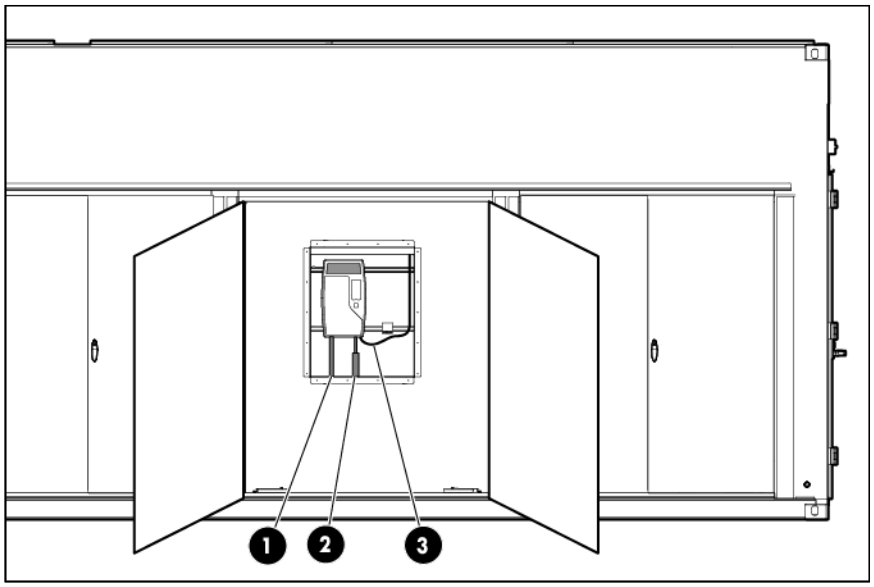


Replacing the humidifier

1. Replace the humidifier (1), and then secure the humidifier to the wall with four screws (2).

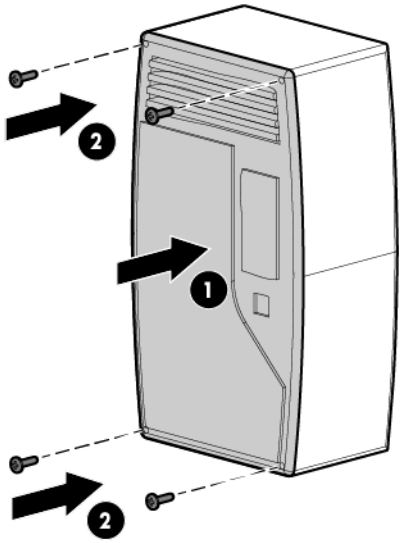


2. Connect the drain (1).
3. Connect the humidifier to the water supply line (2).
4. Route and connect the external electrical wiring to the housing (3).



5. Locate the power board and connect the two internal electrical wires.

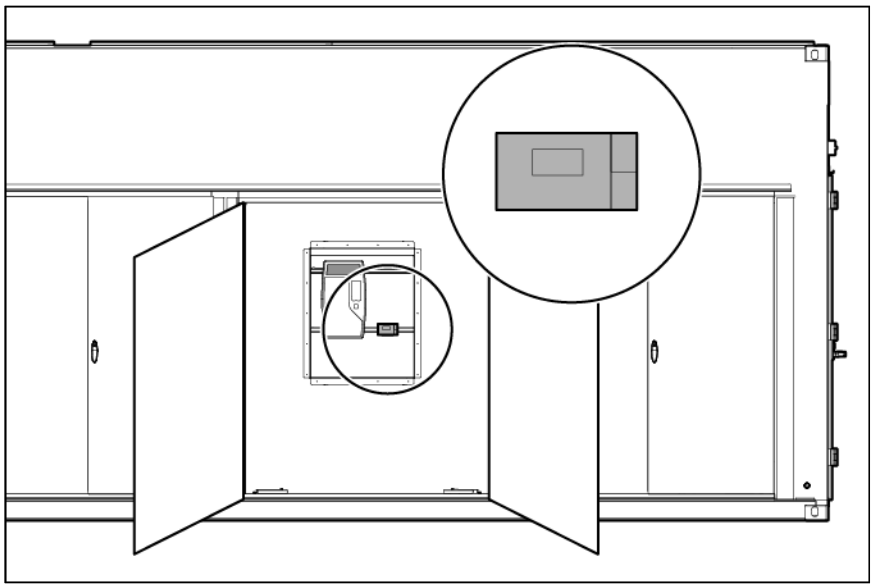
6. Replace the humidifier cover (1), and then secure the cover with four screws (2).



7. Open the water supply isolation valve on the HP POD 40c NA exterior.
8. Connect the water supply line to the humidifier on the HP POD 40c NA exterior.
9. Close the associated circuit breaker in the ECS cabinet.
10. Press the power button on the outside of the humidifier to power up the humidifier.

Humidistat

The humidistat is located in the cold aisle humidifier bump out.

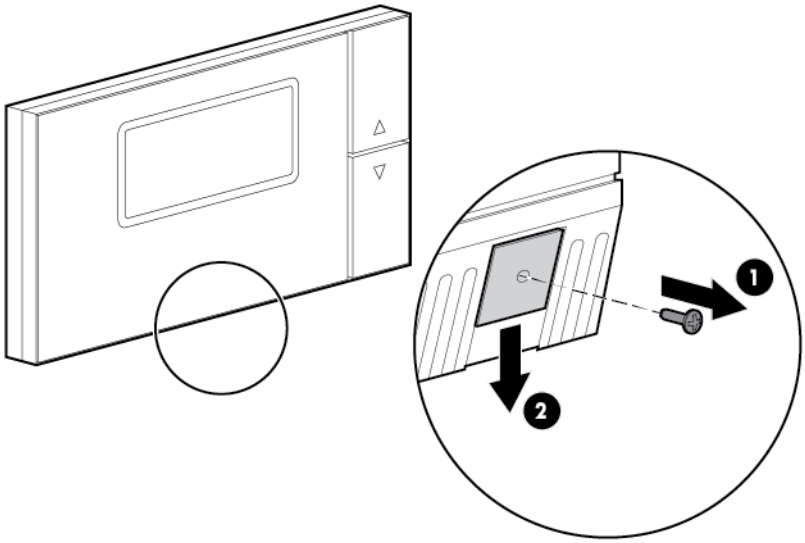


You need a screwdriver and a flathead screwdriver for installation.

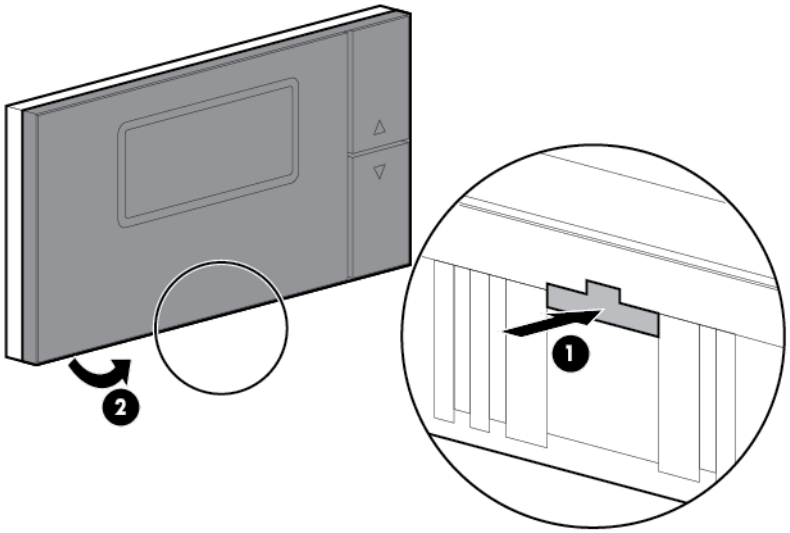
Removing the humidistat

1. Press the power button on the outside of the humidifier to power down the humidifier.

2. Open and danger tag the associated circuit breaker in the ECS cabinet. The circuit breakers are identified on the panel schedule.
3. Detach the front panel of the humidistat from the mounting base:
   a. Remove the screw securing the tab in the opening (1), and then slide the tab to the open position (2).



   b. Use a flathead screwdriver to the press the release button (1), and then pull the front panel from the bottom to detach the panel (2). The two parts remain connected by a flat cable.

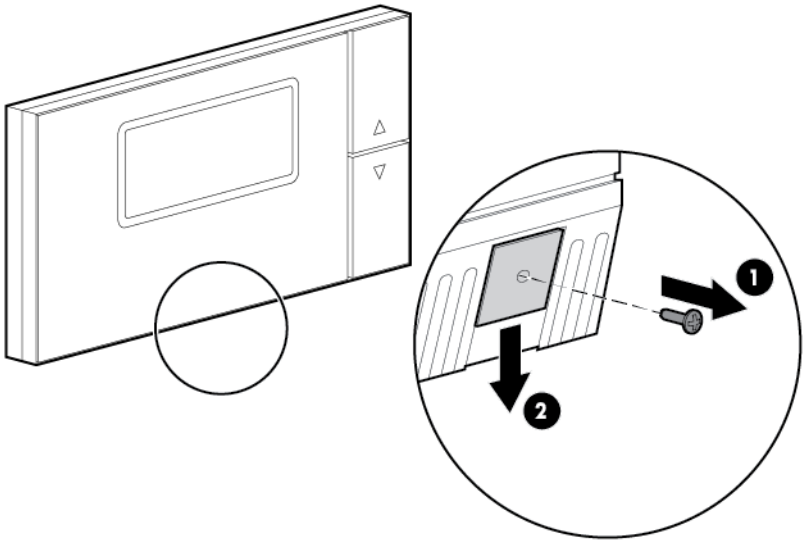


4. Squeeze the two terminal cover fins to remove the cables from the terminal block.
5. Remove the screws securing the mounting base to the wall.

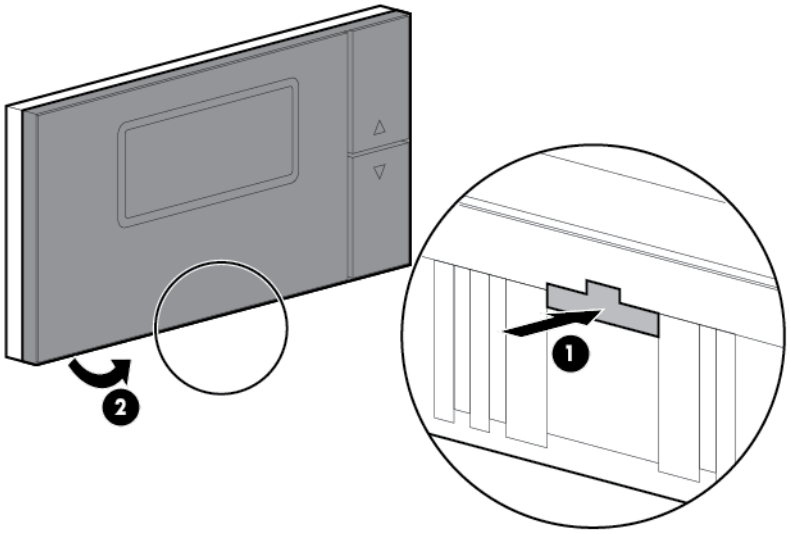
Replacing the humidistat

1. Detach the front panel of the replacement humidistat from the mounting base.

a. Remove the screw securing the tab in the opening (1), and then slide the tab to the open position (2).



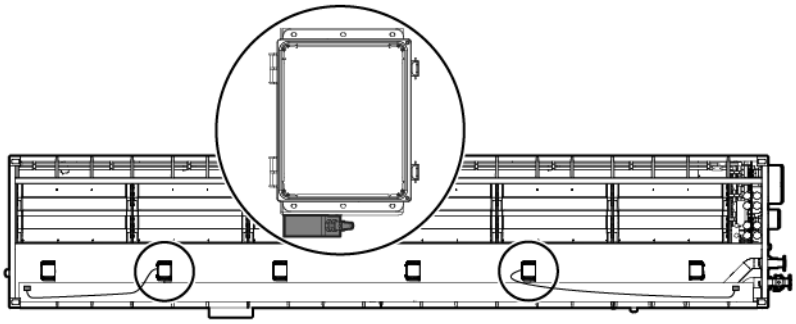
b. Use a flathead screwdriver to the press the release button (1), and then pull the front panel from the bottom to detach the panel (2). The two parts remain connected by a flat cable.



2. Secure the mounting base to the wall using the screws provided.
3. Squeeze the two terminal cover fins to remove the terminal covers.
4. Make the required connections by running the connection cables through the center hole in the bottom of the mounting base and connecting the cables to the terminal block.
5. Separate the connection and control cables from the relay cables.
6. Attach the front panel.
7. Close the associated circuit breaker in the ECS cabinet.
8. Press the power button on the outside of the humidifier to power up the humidifier.

Humidity sensor

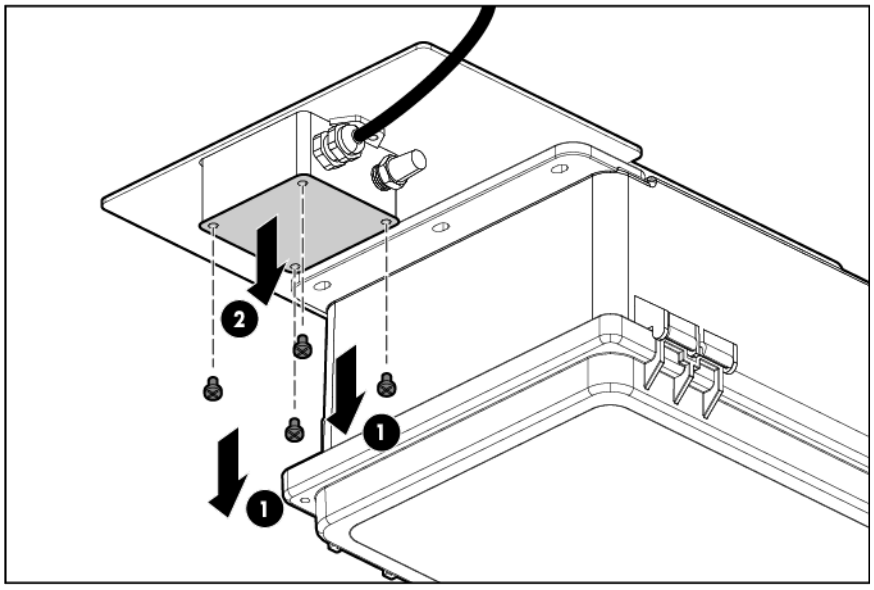
The HP POD 40c NA contains two humidity sensors, one in cooling zone 2 and one in cooling zone 5.



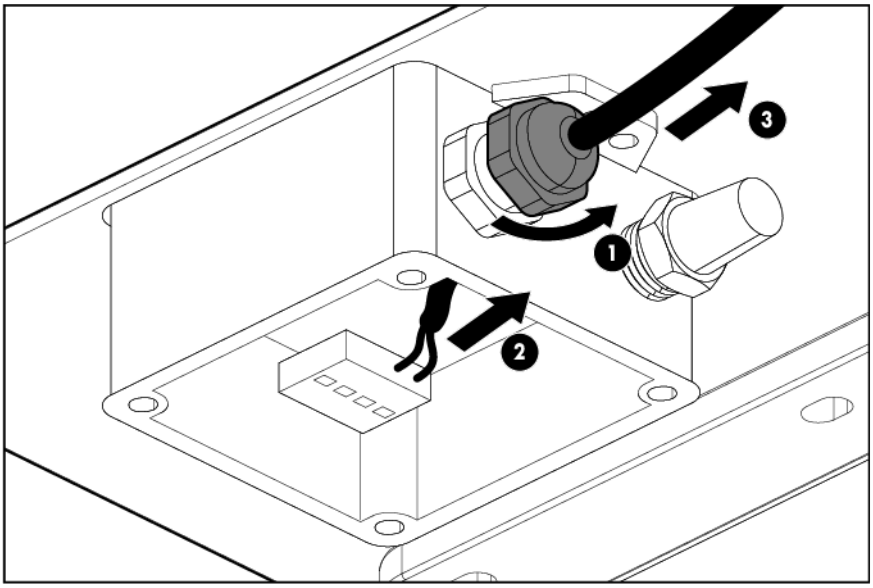
You need a screwdriver for installation.

Removing the humidity sensor

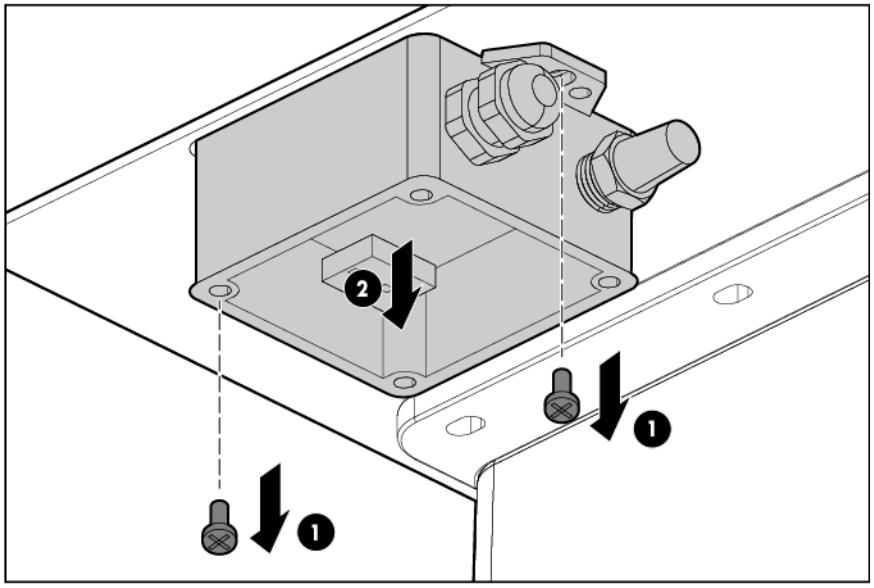
1. Remove the four screws that secure the sensor cover (1), and then remove the cover (2).



2. Loosen the sensor wires by turning the nut counter clockwise (1), remove the sensor wires from the terminal block, and then remove the sensor wires (3).

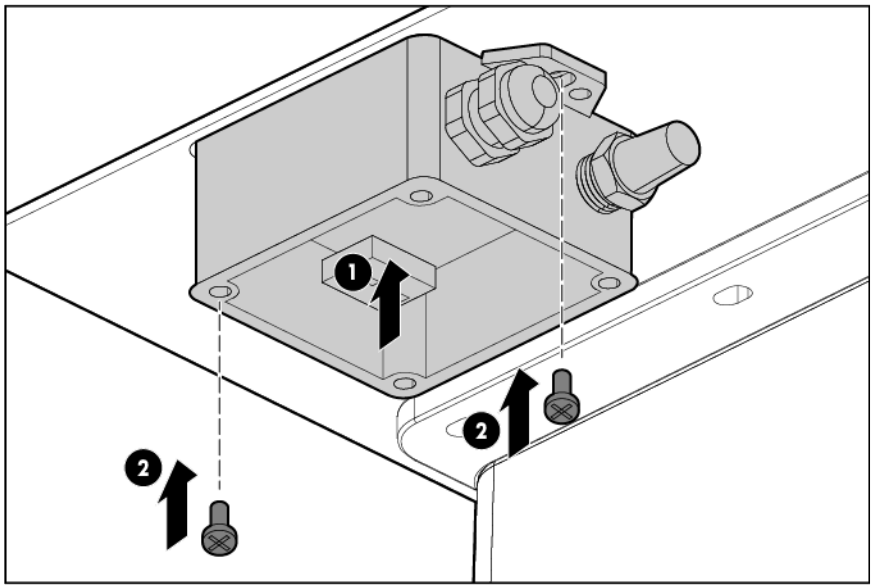


3. Remove the two screws that secure the sensor (1), and then remove the sensor (2).

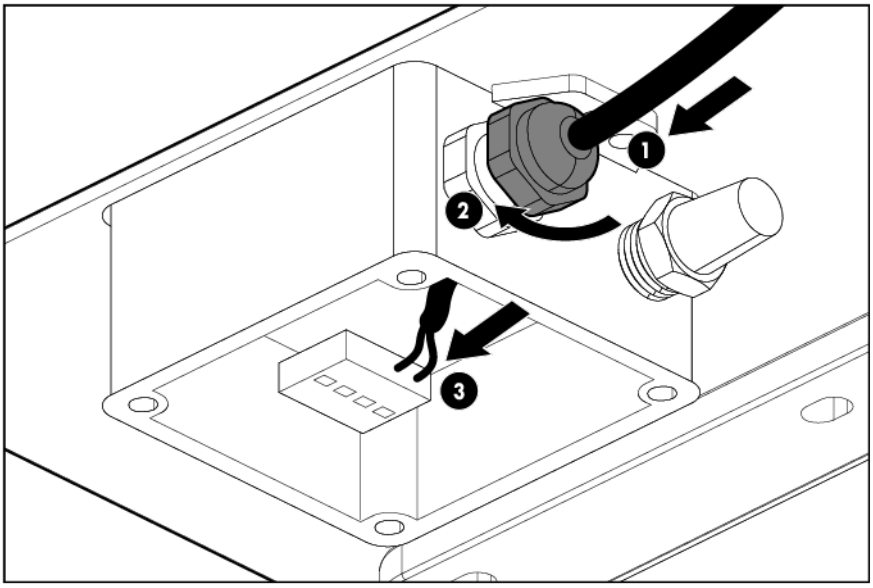


Replacing the humidity sensor

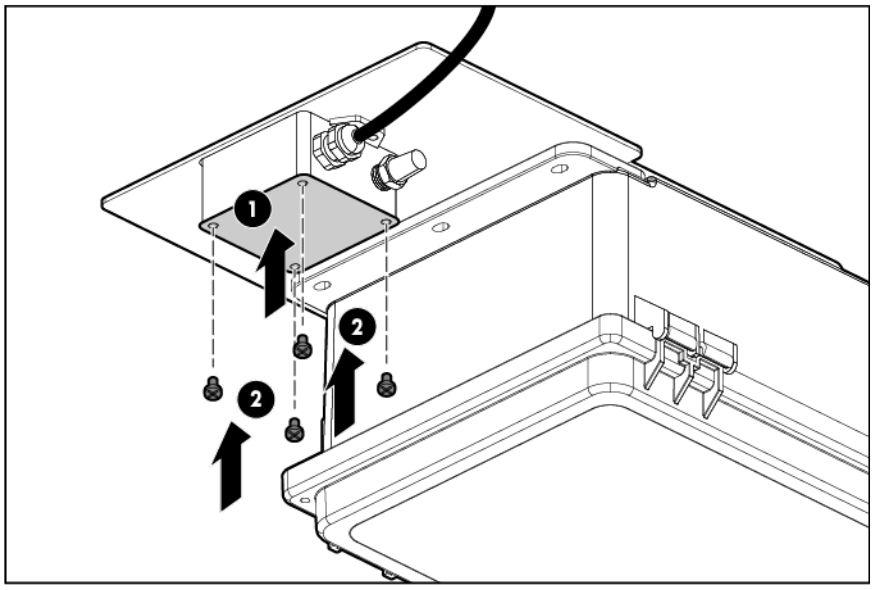
1. Replace the sensor (1), and then secure the sensor with two screws (2).



2. Insert the sensor wire into the nut (1), secure the wire by turning the nut clockwise (2), and then insert the wire into the terminal block (3).

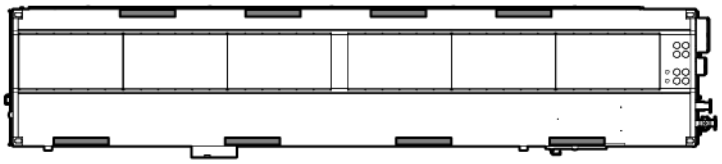


3. Replace the sensor cover (1), and then secure the cover with four screws (2).



LED light

Each POD contains eight LED lights.



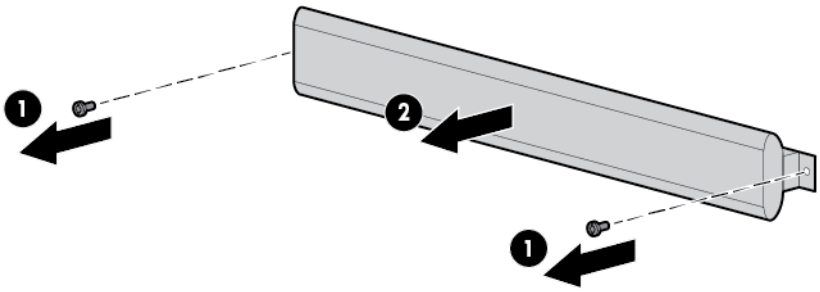
You need adhesive tape for installation.

Removing the LED light

You need a screwdriver for installation.

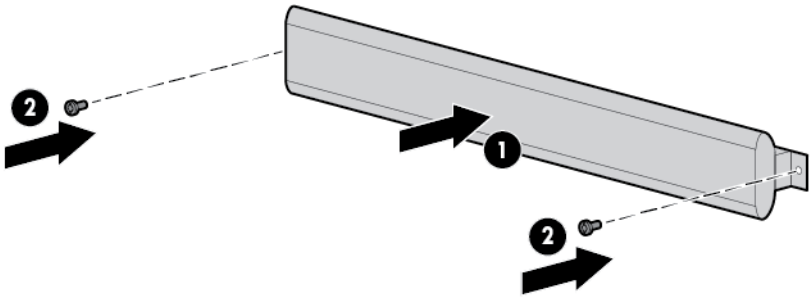
1. Disconnect power from the LED light.
2. Remove the screws (1).

3. Remove the LED light assembly (2).



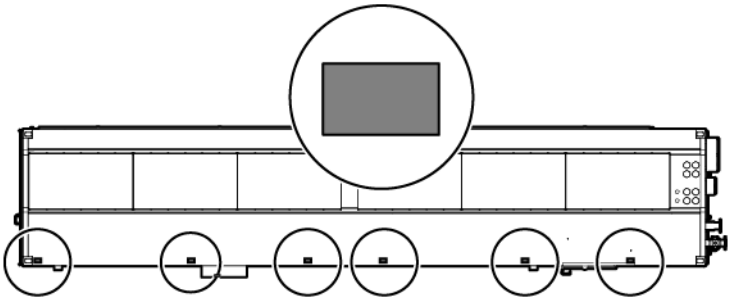
Replacing the LED light

1. Place the LED light where you want to secure it (1).
2. Insert the screws (2).
3. Reconnect power to the LED light.



Temperature sensor (cold aisle)

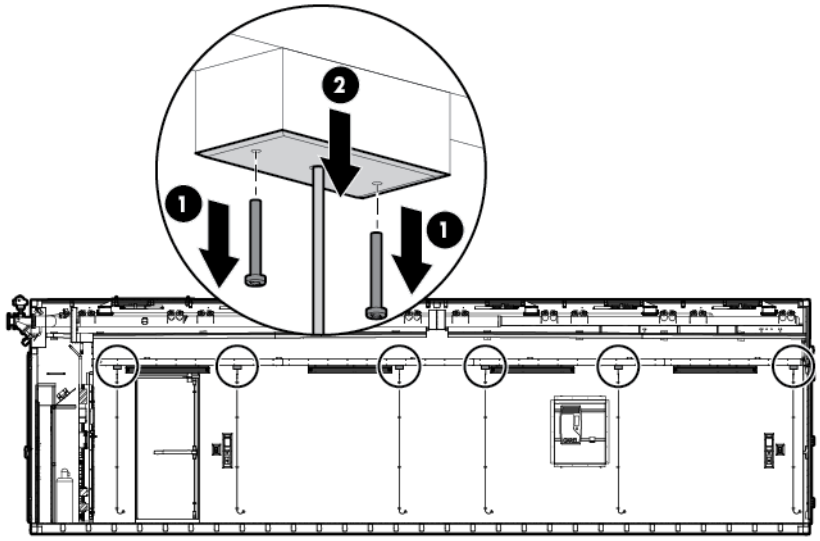
The HP POD 40c NA contains six temperature sensors in the cold aisle.



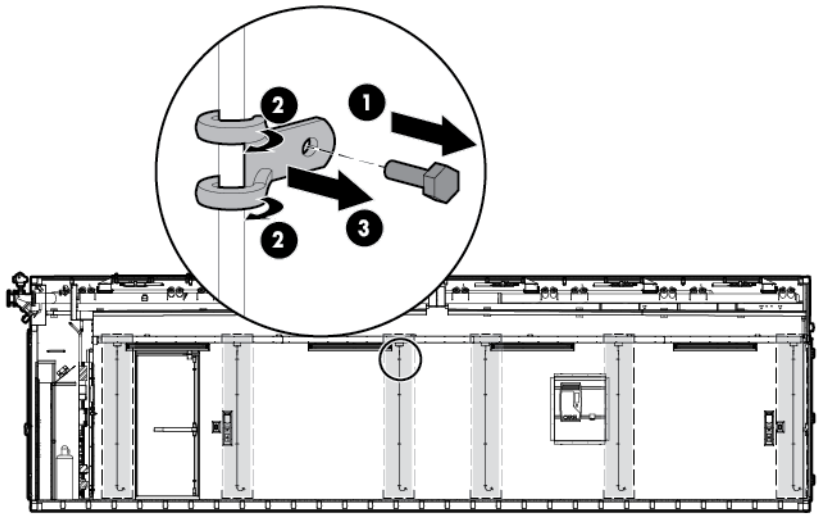
You need a screwdriver and scissors for installation.

Removing the cold aisle temperature sensor

1. Remove the two screws that secure the sensor cover (1), and then remove the cover (2).



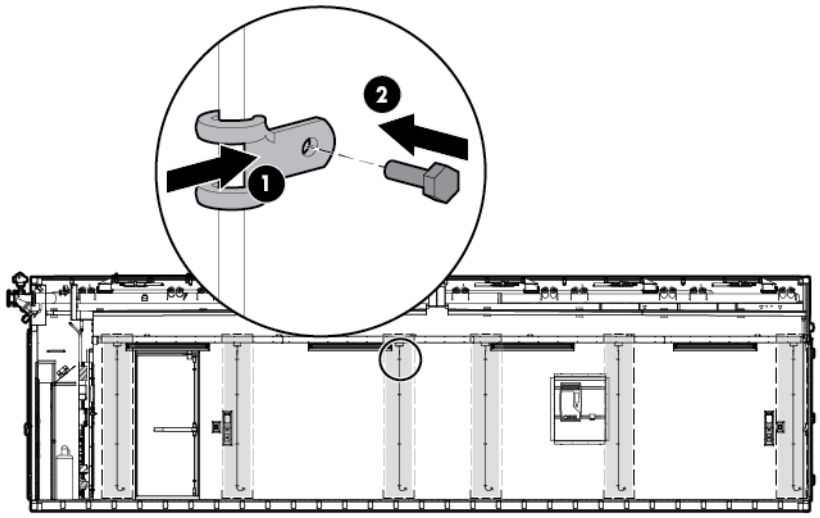
2. Cut the two red wires inside the sensor box.
3. For each of the five clamps securing the sensor tube to the HP POD 40c NA structure, remove the screw that secures the clamp (1), rotate the clamp (2), and then pull the clamp out to remove the clamp (3).



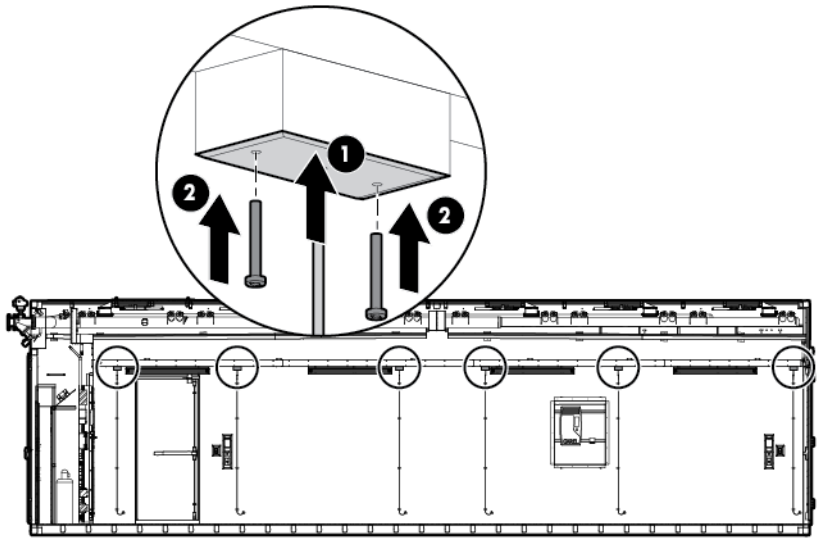
4. Remove the sensor tube.

Replacing the cold aisle temperature sensor

1. Replace the sensor tube, and then secure the tube with five clamps. For each clamp, replace the clamp (1), and then secure the clamp with a screw (2).

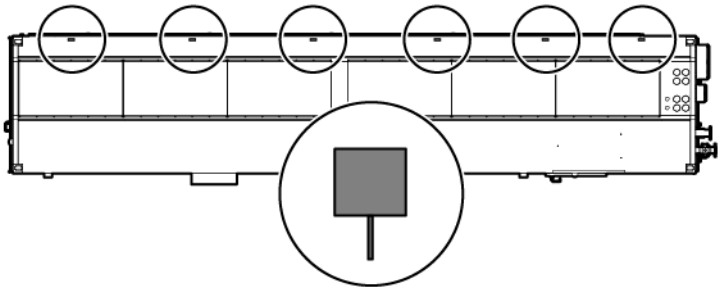


2. Splice the two sensor tube wires with the red wires inside the sensor box.
3. Replace the sensor cover (1), and then secure the cover with two screws (2).



Temperature sensor (hot aisle)

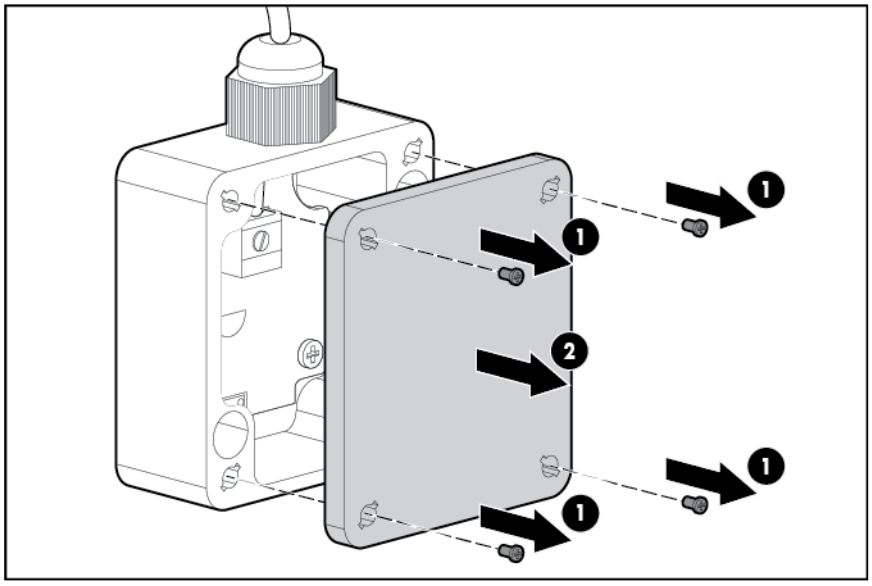
The HP POD 40c NA contains six temperature sensors in the hot aisle.



You need a screwdriver for installation.

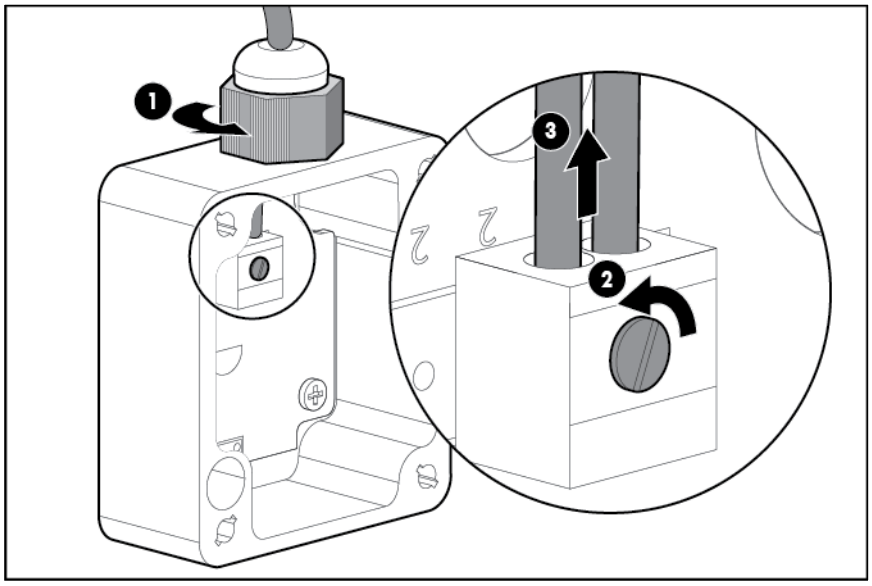
Removing the hot aisle temperature sensor

1. Remove the four screws that secure the sensor cover (1), and then remove the cover (2).

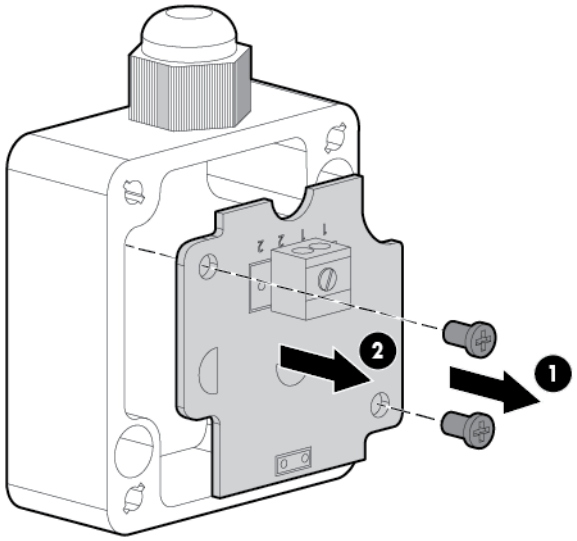


2. Loosen the sensor wires by turning the nut counter clockwise (1).

3. Loosen the screw securing the wires (2), and then remove the sensor wires (3).

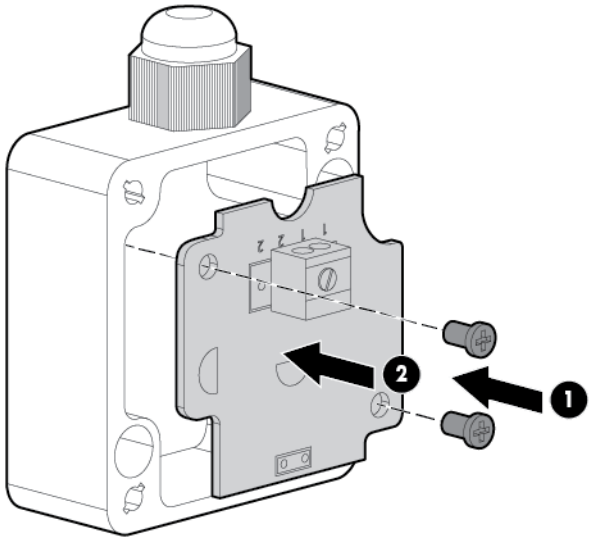


4. Remove the two screws that secure the sensor (1), and then remove the sensor (2).

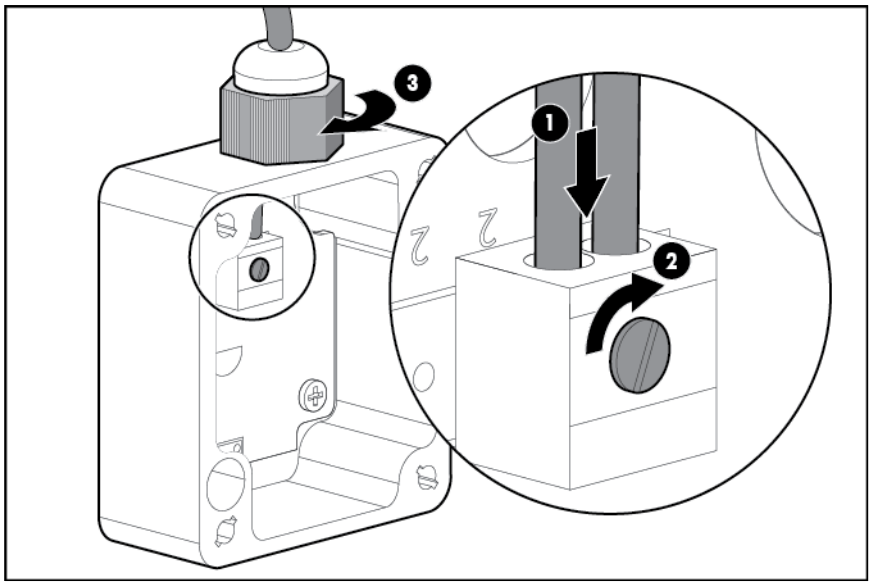


Replacing the hot aisle temperature sensor

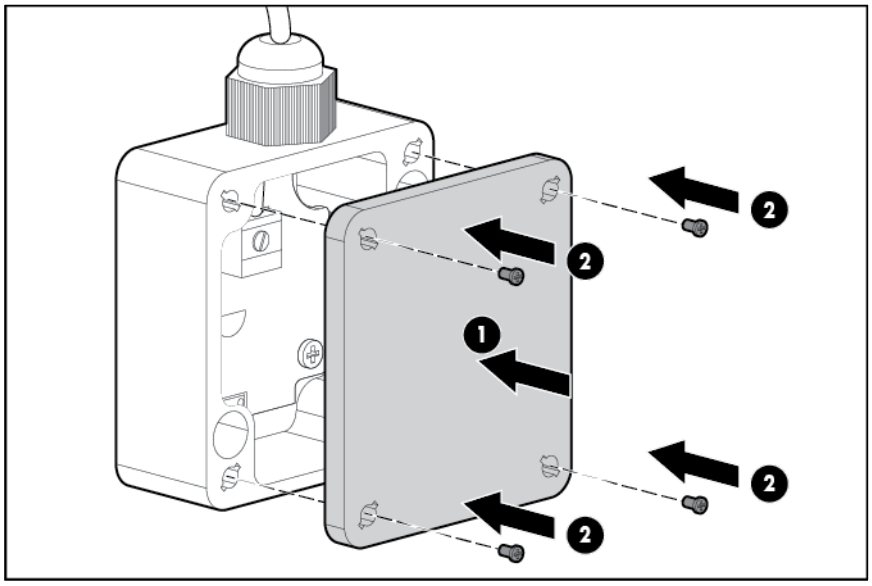
1. Replace the sensor (1), and then secure the sensor with two screws (2).



2. Insert the sensor wires into the screw (1), and tighten the screw (2).
3. Secure the wire by turning the nut clockwise (3).



4. Replace the sensor cover (1), and then secure the cover with four screws (2).



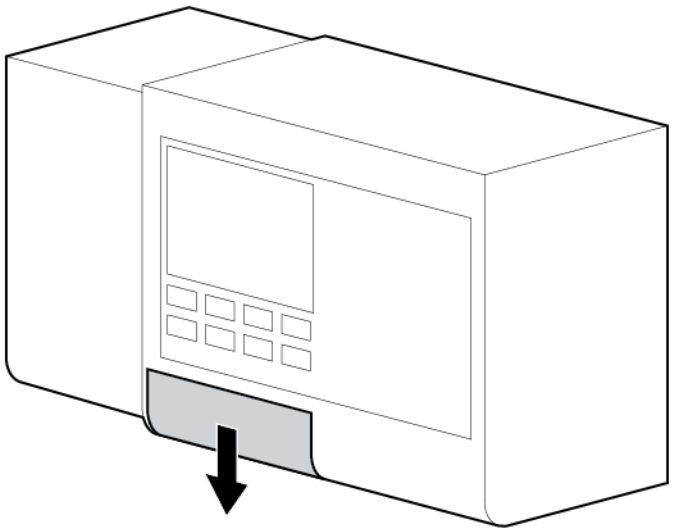
VESDA filter

The VESDA filter sensor notifies you through the ECS when a filter must be changed. HP recommends that you periodically inspect and change each VESDA filter. A VESDA filter can be replaced during normal HP POD 40c NA operation.

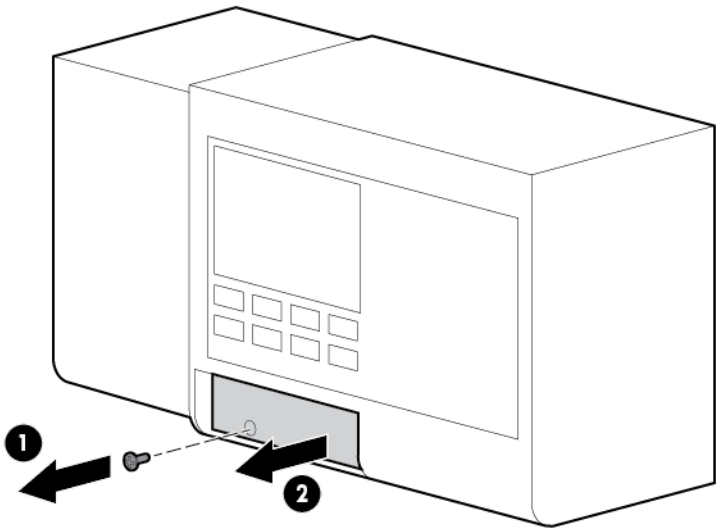
You need a screwdriver for installation.

Removing the VESDA filter

1. Remove the filter cover on the front of the VESDA unit.

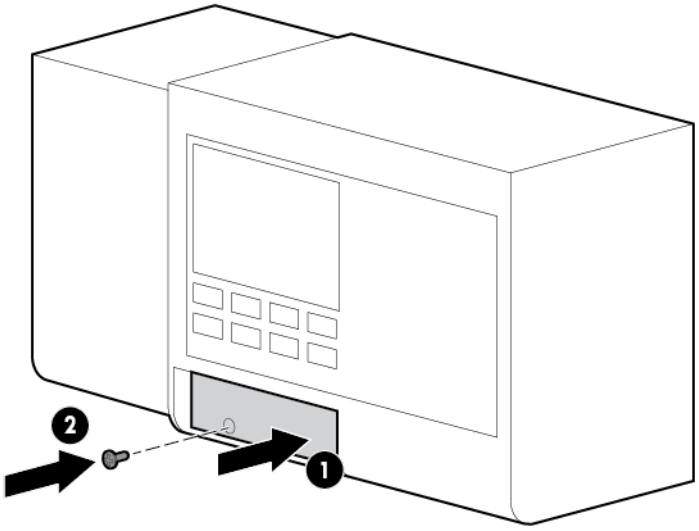


2. Remove the 10mm screw that secures the VESDA filter (1), and then remove the filter (2).



Replacing the VESDA filter

1. Insert the new VESDA filter (1), and then replace the 10mm screw that secures the filter (2).



2. Replace the VESDA filter cover.

Periodic maintenance

Periodic maintenance overview

Perform periodic inspections on the components in this section to ensure that the HP POD 40c NA continues to perform within the designed parameters.

Qualified personnel

Qualified personnel are identified as personnel who are:

- Properly trained in the operation and maintenance of the HP POD 40c NA
- Customer-authorized to conduct maintenance activities

Qualified personnel can be:

- HP personnel
- Agents for HP
- Site maintenance personnel

Cooling system maintenance schedule

Component to be inspected	Task	Frequency	Capable Party
Air filters	Inspect and replace as necessary	Quarterly, or as needed	Qualified personnel
Air filter differential pressure sensor	Inspect and test, replace as necessary	Annually	Qualified personnel
Cooling system leak check	Verify there is no visible chilled water leak from: • Heat exchanger • Cold water supply piping • Cold water return piping If a leak is detected, see "Leak detection maintenance (on page 63)"	Quarterly	Qualified personnel
Condensate drain pans	Inspect pans: • Free of debris • No leaks • Leakage detectors are in proper position Clean pans as necessary	Quarterly	Qualified personnel
Condensate drain pan sensors	Inspect and test, replace as necessary If a leak is detected, see "Leak detection maintenance (on page 63)"	Quarterly	Qualified personnel

Component to be inspected	Task	Frequency	Capable Party
Condensate drain lines and p-trap	Inspect and verify: • No blockage of the drain line—internal • Condensate can pass freely • P-traps are intact and not leaking • No blockage of the drain line—external to the site drain Clean and remove debris as necessary	Quarterly	Qualified personnel
Heat exchanger fans	Inspect wiring and verify that electrical components are secure and fan power supplies are locked into position	Quarterly	Qualified personnel
Chilled water header drain pan and lines	Inspect drains for blockage internal and external to the POD	• Monthly, if staffed • Quarterly, if not staffed	Qualified personnel
—	Conduct five gallon operation check of the external site drain, if possible	Annually	Qualified personnel

Leak detection maintenance

WARNING: To reduce the risk of electric shock or damage to the equipment, use extreme caution when removing and replacing components that involve water around the electrical equipment. There is great risk of electrical shock when water is used near electricity.

CAUTION: If a serious leak develops, shut down the POD immediately and isolate the chilled water cooling system from the site. Contact HP immediately to initiate a field service call. Do not attempt to repair the chilled water cooling system. Attempting to self-repair the chilled water cooling system during the warranty or service contract period shifts all liability to you.

IMPORTANT: HP recommends shutting down the POD after a leak is detected. For more information, see "Power down procedure" in the user guide.

Non-isolable leak detection

A non-isolable leak is a leak from the main supply line or the return header.

To repair a non-isolable leak:

1. Power down all IT equipment.
2. Re-direct the leaking water away from the IT equipment.
3. Repair the leak or contact HP if you are still within your service contract.

Isolable leak detection

An isolable leak is any type of leak that does not occur from the main supply line or the return header.

To repair an isolable leak:

1. Inspect the zone indicated on the ECS Status Overview screen. You might need to inspect each zone condensate drain pan to determine the exact location of the leak.

2. Power down the IT equipment in the zone where the leak is located.
3. Determine the affected heat exchanger.
4. Close and danger tag the supply and return valves to the affected heat exchanger.

   If the heat affected exchanger cannot be identified, close all the heat exchanger supply and return valves in the affected zone and open one supply valve at a time to determine the location of the leak.
5. Repair the leak or contact HP if you are still within your service contract.

Humidifier (if installed)

Component to be inspected	Task	Frequency	Capable Party
Humidifier	• Inspect for water leaks, verify that no sparks form between the electrodes during operation • Inspect the general operation of the cylinder.	• Every 2 weeks, if staffed • Quarterly, if not staffed	Qualified personnel
Humidifier drains	Verify the following: • Drains are in working order • There is an air gap at the funnel/drain entry into the site system • Drain discharge is not getting water on external equipment or grounding system	Quarterly	Qualified personnel
—	Put the humidifier in system flush mode and inspect drain flow and water supply flow. Inspect, clean, and/or replace as necessary.	Quarterly	Qualified personnel
—	Inspect for any internal or external water leaks, repair or replace leaking components.	Quarterly	Qualified personnel
—	Using LLS, verify proper cylinder operation. Inspect the cylinder for blackened areas and, if present, check the condition of the electrodes. If necessary, replace the cylinder.	Quarterly	Qualified personnel
—	Replace the cylinder.	Annually	Qualified personnel

ECS

Component to be inspected	Task	Frequency	Capable party
Full system functional check	Check the operation of all system components.	Quarterly	Qualified personnel
—	Check and clear the alarm log.	Quarterly	Qualified personnel
—	Inspect and test the ECS battery backup system.	Every 2 years	Qualified personnel

Electrical

Maintenance of the electrical components might require the following:

- Expose personnel to high voltage.
- Allow personnel to come into direct contact with high voltage.
- Power down the POD during the execution of the maintenance item.

You must explicitly state and acknowledge if a POD power down will be possible. If a power down is not possible, LLS inspections will be conducted and further action will be taken at your discretion.

Component to be inspected	Task	Frequency	Capable Party
Electrical connections	Use LLS to check for major electrical connections (torque marks, sizzle, and acrid odor): • Main/House Power Feeds • Busway End Feeds, Drop Boxes (including cables and cord caps) • Electrical panels, breakers, and disconnects	Quarterly	Licensed electrician
—	**POD SHUT DOWN REQUIRED** Conduct torque checks on the following: • Main, house, and critical IT power feeds • Electrical panels, breakers, and disconnects • Busway end feeds, busway sections, and drop box locking mechanism (bolt)	Annually	Licensed electrician
Grounding	Grounding system residence test using the DUCTOR method	Every 2 years	Licensed electrician
—	**POD SHUT DOWN REQUIRED** Ground and grounding connection/lug located internal to each electrical panel torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician
—	Service entrance grounding ground-rod/ground well and grounding connection/lug located external to the POD torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician
—	**POD SHUT DOWN REQUIRED** Service entrance ground connection/lug located on the switchboard (or landing location) torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician
—	Grounding system bonding jumpers that connect racks to the POD structure and rack to rack torque test. Clean and re-tighten as necessary.	Every 2 years	Licensed electrician

Component to be inspected	Task	Frequency	Capable Party
Circuit breakers	Panel breaker operational test (open and shut).	Annually	Licensed electrician
—	LLS inspection of breakers, disconnects, motor starters, and fuse holders (physical).	Quarterly	Licensed electrician/Qualified personnel
—	Breaker fault testing for all breakers ≥ 250AF	Every 3 years	Third party testing facility
Sensors	Verify proper operation of: • Internal POD temperature sensors (thermometer) • Relative humidity sensors (RH meter) (Investigate discrepancies, trouble shoot, and replace as necessary.)	Annually	Qualified personnel
—	Compare the following with site indications (if available): • CWS/CWR temperature • CWS/CWR pressure • Flow rate (if possible) (Investigate discrepancies, trouble shoot, and replace as necessary.)	Annually	Qualified personnel
—	**POD SHUT DOWN REQUIRED** Calibrate (zero out) POD differential pressure sensors. (Investigate discrepancies, trouble shoot, and replace as necessary.)	Annually	Qualified personnel
Lighting	Visual inspection of lighting fixtures and lamps. Replace components upon failure.	As needed or Quarterly	Licensed electrician/ Qualified personnel

Fire alarm and suppression system

Component to be inspected	Task	Frequency	Capable Party
Full system functional check	Inspect and perform a functional check of the system	As required by local code	Authorized technician
Fire panel	Inspect and test fire panel battery backup system	Every 2 years	Authorized technician
VESDA	Inspect and test VESDA power supply	Quarterly	Authorized technician
—	Inspect the VESDA pipe network	Every 2 years	Authorized technician
—	Inspect the VESDA filter. Replace as necessary	Annually	Qualified personnel
—	Conduct a VESDA pipe integrity smoke test	Annually	Authorized technician
—	Check the VESDA pipe flow	Annually	Authorized technician
—	Clean the VESDA sampling points	Every 2 years	Authorized technician
—	Flush the VESDA pipe network	Every 2 years	Authorized technician
—	VESDA system air sampling/smoke test	As required by local code	Authorized technician

Component to be inspected	Task	Frequency	Capable Party
Suppression system	Suppression system test	As required by local code	Authorized technician
—	Fire-pull visual and operational inspection	As required by local code	Authorized technician
—	Fire strobe and horn visual and operational inspection	As required by local code	Authorized technician

HP POD 40c NA structure

Component to be inspected	Task	Frequency	Capable Party
Complete structure	Visually inspect the structural integrity.	Annually	Qualified personnel
—	Inspect the door operation and inspect the door gaskets for water and air leaks.	Annually	Qualified personnel
—	Visually inspect the paint. Perform prep and touch-up as necessary.	Annually	Qualified personnel

Life safety

Component to be inspected	Task	Frequency	Capable Party
Manual EPO shunt trip	**EPO FUNCTIONAL TEST (POD will power down)** Manually initiate EPO with the internal and external push buttons (if installed) in succession. (Verify all shunt-trips on all panels trip.)	Annually	Qualified personnel
Thermal EPO shunt trip	**EPO FUNCTIONAL TEST (POD will power down)** Initiate a thermal (automatic) EPO shutdown via the EPO temperature switches located in the hot aisle. (Verify all shunt-trips on all panels trip.)	Annually	Qualified personnel

Component to be inspected	Task	Frequency	Capable Party
EPO System Test	**EPO NON-FUNCTIONAL TEST** Mode Key Switch Test - rotate keyed switch through all modes. ARMED MODE - Verify: • Power Indicator - White • Armed Light - White BYPASS MODE - Verify • Bypass Light - Green TEST MODE - Verify: • Test Light - Amber Press EPO button (each in succession) and thermal trip to verify: • Reset Light - White • Audible alarm • Visual lamp indicator Replace light upon failure	Annually	Qualified personnel
Emergency Lighting	Verify emergency lighting is visible when all lighting is off and the POD doors are shut.	Every 2 years	Qualified personnel
Exit signs	Visually inspect exit signs for damage. Replace as necessary.	Every 2 years	Qualified personnel
Emergency egress	Personnel door emergency egress panic bars. (Visual and operational inspection.)	Every 2 years	Qualified personnel

Access control

Component to be inspected	Task	Frequency	Capable Party
System functional test	Visual inspection and operational test of door access contact switches	Annually	Qualified personnel
—	Visual inspection and operational test of the following: • Door access card readers • Electric strikes • Door release switches at each personnel door and/or in each personnel door panic bar	Annually	Qualified personnel

Third-party components

All maintenance for third-party equipment will be defined by the manufacturer of the equipment. HP will, with a defined and signed SOW, conduct all maintenance as identified by the original manufacturer.

Examples of external third party components that HP will conduct all manufacturer specified maintenance with a signed SOW includes:

- External UPS equipment

Internal UPS and rack equipment that is purchased from HP is covered by a standard HP warranty and services contract, purchased separately.

- Generators
- Switchgear

For maintenance activities for all third party equipment purchased as part of and delivered with the HP POD 40c NA, see the *Operations and Maintenance Manual for the HP Performance Optimized Datacenter 40c NA*. This manual might not cover equipment purchased through Critical Facilities Services.

Specifications

General specifications

Features	Specifications
Overall dimensions	• Height—3.66 m (12 ft) • Length—12.19 m (40 ft) • Width—2.43 m (7.97 ft)
Weight[1]	Empty—16,783 kg (37,000 lb) Maximum fully loaded—46,266 kg (102,000 lb)
Maximum power[2]	600 kW HP POD 40c NA
Power input voltage	380 VAC to 415 VAC
Power distribution[3]	8 x 200 A electrical busways
Maximum rack quantity	20 racks
RU per rack	50 RU
RU total	1,197 RU
Average capacity per rack (kW)	30 kW
Peak rack capacity	69 kW
Voltage to rack	200 VAC to 240 VAC
Minimum quantity of PDUs per HP POD 40c NA	20 (one per rack)
Maximum quantity of PDUs per HP POD 40c NA	40 (two per rack)
Maximum power per PDU	30A = 17 kW; 60A = 34 kW
Network supported	Bulk cable pass through fiber Bulk cable pass through copper (Optional) External rated demarcation box

[1]The Empty weight includes the HP POD 40c NA structure, empty racks, PDUs, and drop boxes. It does not include IT equipment. All weights are estimates and can vary for your POD.
[2]Maximum power depends on the exact installation and power configuration in your POD. The HP POD 40c NA is electrically limited to 600 kW.
[3]Can be configured for redundancy or non-redundancy.

Electrical specifications

Electrical busway system information

Feature	Specification
Number of busways	8
Frequency	60 Hz
Amps (per busway)	200 A
Voltage (per busway)	380 to 415 V
Grounding	Copper
Busway configuration	3-phase + neutral + equipment ground

Fire alarm panel connections

The electrical layout of the fire alarm system is as described in the schematic drawing supplied with the HP POD 40c NA.

Water specifications

The following table describes the chilled water system specifications for the HP POD 40c NA.

Feature	Specification
Facility input temperature to the HP POD 40c NA	12°C to 24°C (55°F to 75°F)
Working pressure	1,034 kPa (150 psi)
HP POD 40c NA pressure drop	172.4 kPa (25 psi)
HP POD 40c NA water flow rate	908.5 lpm (240 gpm)
Chilled water supply and return connections	• North America—Two 10.16 cm (4 in) ASME B16.5 class #150 flanges • International—Two DIN PN16 DN100 flanges

Rack specifications

Standard HP POD 40c NA racks (AT978A)

Feature	Specification
U height	50U
Width	54.6 cm (21.5 in)
Depth	99 cm (39 in)*
Maximum load weight	1,360.7 kg (3,000 lb)

*This specification indicates the maximum clearance for the cold aisle. Equipment cannot exceed this measurement.

Thermal and air flow performance

Maximum thermal and air flow performance parameters	HP POD 40c NA specification
Air temperature—Inlet to rack-mounted components)	Dependent on IT configuration and chilled water inlet temperature
Chilled water temperature	12°C to 24°C (55°F to 75°F)
Total rack-mounted component air flow	Variable as required to maintain the hot aisle setpoint temperature and dependent on IT configuration
Heat rejection capacity	600 kW

Environmental specifications

Feature	Specification
Operating temperature	-28°C to 54°C (-18°F to 130°F)

Feature	Specification
Non-operating temperature*	-29°C to 54°C (-20°F to 130°F)
Operating humidity	• 0% to 100% external • 10% to 90% non-condensing internal
Non-operating humidity*	• 5% to 95% relative non-condensing • 39°C (102°F) maximum wet bulb temperature
Operating altitude	-76.2 m to 3,048 m (-250 ft to 10,000 ft)
Non-operating altitude	-76.2 m to 9,144 m (-250 ft to 30,000 ft)

*For non-operating specifications, consider the temperature of computer and IT equipment inside the HP POD 40c NA.

Optional features specifications

Feature	Specification
Fire suppression	3M Novec 1230 fire extinguishing system provided in two canisters (main and reserve)
Card reader	12-key pad with 125 KHz proximity and 13.56 MHz contactless smart card
Humidifier	Provides 2-8 lb/hr of water vapor into cold aisle to maintain POD environment within 20% to 80% relative humidity

Contacting HP

Before you contact HP

Be sure to have the following information available before you call HP:

- Active Health System log (HP ProLiant Gen8 or later products)

  Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the *HP iLO 4 User Guide* or *HP Intelligent Provisioning User Guide* on the HP website (http://www.hp.com/go/ilo/docs).
- Onboard Administrator SHOW ALL report (for HP BladeSystem products only)

  For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (http://www.hp.com/go/OAlog).
- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For United States and worldwide contact information, see the Contact HP website (http://www.hp.com/go/assistance).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (http://www8.hp.com/us/en/support-drivers.html). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html).

Regulatory information

Safety and regulatory compliance

For safety, environmental, and regulatory information, see *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the HP website (http://www.hp.com/support/Safety-Compliance-EnterpriseProducts).

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine RoHS material content declaration

Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057

Warranty information

HP ProLiant and X86 Servers and Options (http://www.hp.com/support/ProLiantServers-Warranties)

HP Enterprise Servers (http://www.hp.com/support/EnterpriseServers-Warranties)

HP Storage Products (http://www.hp.com/support/Storage-Warranties)

HP Networking Products (http://www.hp.com/support/Networking-Warranties)

Glossary

AHJ

authority having jurisdiction

branch circuit

The conductors and components following the last overcurrent protective device protecting a load.

control transformer

A transformer whose secondary supplies power to control circuit devices only (excluding loads).

cover

An unhinged portion of an enclosure that covers an opening.

door

A hinged portion of an enclosure that covers an opening.

ECS

environmental control system

EPO

emergency power off

equipment

A general term, including fittings, devices, appliances, luminaries, apparatus, machinery, and the like used as a part of, or in connection with, a modular data center (Source: NEC).

fuse, branch circuit type

A fuse of Class CC, G, H, J, K, L, R, and T. These fuses are able to provide branch circuit protection.

IEC

International Electrotechnical Commission

LLS

LLS means look, listen, and sniff. Use your visual, auditory, and olfactory senses to detect electrical fires.

NA

North American

PDU

power distribution unit

PLC

programmable logic controller

PPE

personal protective equipment

RU

rack units

structure

Enclosure of sufficient size to enable entry of personnel.

UPS

uninterruptible power system

VESDA

very early smoke detection apparatus

Documentation feedback

HP is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (mailto:docsfeedback@hp.com). Include the document title and part number, version number, or the URL when submitting your feedback.

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